

# The Iron Age

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by DAVID WILLIAMS, No. 83 Reade Street, New York. Entered at the Post Office, New York, as Second-Class Matter.

Vol. XXIX: No. 26.

New York, Thursday, June 29, 1882.

\$4.50 a Year, Including Postage.  
Single Copies, Ten Cents.

## The Joy Valve Gear.

There is, perhaps, no recent mechanical improvement attracting so much attention at present time among steam engineers as the Joy valve gear, accounts of which have reached this country from the foreign technical press. Some of these descriptions have been republished in American technical journals. The success of the Webb compound locomotive, in which this gear formed a prominent feature, attracted a great deal of attention on both sides of the water at the time of its trial. No adequate description, however, so far as our information goes, has yet been presented, therefore, engineers and mechanics generally are somewhat in the dark as to the merits of the improvement. Mr. Joy is at present in this country for the purpose of introducing his invention and explaining to engineers the peculiarities of his valve gear. At the meeting of the Master Mechanics' Association, held at Niagara Falls last week, Mr. Joy read a paper upon this subject, and also distributed a number of illustrated circulars relating to his invention. Some of the illustrations prepared by Mr. Joy for this purpose, will be found among the engravings on this and the following pages. We have prepared additional cuts in order to make our readers thoroughly familiar with the improvement, and expect to present in another issue a full report of a paper above referred to.

The action of this gear is such that the point of cut-off for the live steam may be varied to give the required degree of expansion, without incurring the evils common to the link motion, of varying the amount of live lead and of steam compression. These advantages are preserved during both piston strokes with the engine running in either direction. By this means there is obtained a distribution of steam that has long been sought for by inventors. The manner of accomplishing these ends is shown in the accompanying engravings, which represent various applications of the gear. The action of the various mechanical parts, however, perhaps be best explained by reference to Figs. 1 and 4, which represent different modes of applications of the gear, but in which letters of reference correspond. Moreover, the valve gear is taken from a point on the connecting rod, the lever B being pivoted at A, while at H it is connected to rod C, which is pivoted at its other end to B. To B is connected the end of a lever or link E, which is pivoted at F to a pin which carries the slide blocks or dies, f, fitting in a slide-way, T, in Z. At end b lever E is connected to the valve spindle G. It is obvious that the vibration of E upon its center F will, supposing the sliding block remains stationary, move the valve spindle G. The slide-way of Z, in which blocks f slide, are, when Z is at its vertical or mid position, an arc of a circle, of which the axis of the pivot (Fig. 1) is the center. Hence if E of Fig. 1 were disconnected from B (by removing the pin at D), moving the pivot F and sliding block f up or down in the slide-way of Z would not impart any motion to G. In the motion, therefore, that is given to G when Z is in its mid position (standing vertically) is that due to the vibration of E upon its pivot F. But the motion of G, and therefore the travel of the valve, may be increased by causing the slide-way in Z to stand out of the vertical position as it is shown in Fig. 5 at X. It is obvious that if f were moved up the slide-way in Z until the axis of its pivot came to the dot at h and then down the slide-way until that axis stood at g, there would be given to f a certain amount of lateral motion, which would be determined by the amount of inclination of Z. Here then is a means of increasing the lateral motion of F, and therefore of the valve, by moving Z so that it stands inclined or out of its vertical or mid position. By varying the valve travel the point of cut-off, and therefore the degree of expansion, is varied. In moving out of the vertical to the position shown at Fig. 5, however, the valve stem, and therefore the valve, will be moved to the right, causing steam to be admitted to the port nearest to the crank. But if Z be moved so that its slide-way inclines to the left, the port furthest from the crank will be opened; hence the forward or backward motion of the engine is governed by the direction of inclination of Z, while the degree of inclination governs, to a certain extent, the travel of the valve, and therefore the amount to which the steam is used expansively. When Z is in mid position the valve travel is such that the port opening for live steam is equal to the amount of lead given to the valve.

We may now explain the construction of the parts as follows: In the method of application shown in Fig. 4 there are two of the slides Z, which are secured together by a link Y, the inner side of said yoke being secured to the shaft L, which is operated in journal bearings by the arm M, in the usual manner. The yoke Y is provided with a bearing at its outer end in a stay-rod secured for that purpose. The advantages of this gear compared with the link gear are given by the inventor as follows: 1. It is simpler and less costly than the link gear by fully 25 per cent., taking the forms of application in both. A comparison of the two shows a saving in weight of parts, allowing increased facility of rolling and fitting. On outside cylinder locomotives a saving of 50 per cent. is claimed.

2. The gear is more correct than the link motion. By setting out the center lines properly, a valve-path diagram is given in which the lead and cut-off are exactly equal for both ends of the cylinder, and they remain so in all grades of expansion to mid-gear; and when the port opens and closes by the amount given as lead at equal distances in each side of the center line.

3. The motion of the valve is not, as in the link motion, limited by a given throw of eccentrics, but as the reversing depends on the angle to which the links Z are inclined, it is only necessary to carry them over a slight amount beyond the usual full gear, or, say, 75 per cent. cut-off, to give an extended opening to the port, which may be carried as far as to allow steam on the piston for 90 per

cent. of the stroke. Hence, wherever an engine might happen to stand it would never be necessary to back it to get away with a train. It would only be necessary to push over the lever, giving a little extra angle to the links Z, and, as stated, the action of the steam would be prolonged on the piston to any desired point. Referring to the other engravings, Fig. 2 shows the application of the Joy valve gear to a marine engine, and illustrates the difference in space occupied between engines equipped in the old and the new way. The advantages gained in this class of engines will be appreciated at once by naval engineers, and are so obvious from the engraving, that it is not necessary to enter into specifications. Fig. 3 shows the Joy

through the space marked A to E the motion imparted to the valve is caused by the center F, of the lever E, Fig. 6, swinging down the inclined arc in which it moves, while the lever action of E is almost suspended. During this time the valve is being opened sharply by the inclination of the arc, and the result is a very rounded curve in the valve path diagram. During the next interval, B to C, in the down stroke, the center F of the lever is continuing to swing down the inclined arc, but the lever E itself has begun to take action as a lever, and this action is counter to and partially neutralizes the movement of the center F. The result is a longer dwell of the valve at the time when it is fully opened. During the next interval, while the crank passes from C to D, the movement of the center, F, is almost nothing, while the lever action of E is fully developed, and its reaction is at the quickest. During this time the valve is being closed. In the next interval, D to E, when the valve is closed, the lever action of E continues, though its effect gradually decreases, while its center, F, is now swinging up the inclined arc. Both are acting in the same direction, but as one diminishes while the other increases, the result is to maintain the speed of the valve nearly constant until approaching the point E, when a considerable acceleration takes place by the center F swinging more rapidly up the inclined arc. This occurs just at the point required for the release, which is thus affected by a quick opening of the exhaust port as it is uncovered by the inner edge of the valve, giving a round, full curve in the release diagram. For the upward stroke the same action is repeated which has just been described for the downward one.

The Joy valve gear is at present attracting attention both in this country and abroad, and its advantages over the old gear will probably soon be more generally recognized and appreciated in engineering circles.

## SCIENTIFIC AND TECHNICAL.

### THE HOLDING POWER OF BRASS TUBES IN TUBE PLATES.

A number of experiments made by Mr. W. H. Shock, U. S. N., on the holding power of brass tubes in tube plates, have given results worthy of attention. Forty-eight experiments were made with brass tubes, 9 in. area in cross section, tubes with screwed ends, having a sectional area of 1.33 inches. The average resistances obtained with each method of tube-fixing before the tubes were withdrawn from the plate was as follows: No. 1, tubes simply tightened with the expander, 6700 pounds; No. 2, expanded and beaded over, 16,829 pounds; No. 3, expanded, ferruled and beaded over, 31,751 pounds; No. 4, expanded, and ends screwed into  $\frac{3}{4}$ -inch nuts, 25,212 pounds; No. 5, expanded, and ends screwed into  $\frac{3}{4}$ -inch nuts, and ferruled in addition, 39,935 pounds. In 75 per cent. of the tests the plate representing the tube plate was  $\frac{3}{4}$  inch thick, and the rest  $\frac{1}{2}$  inch and  $\frac{1}{4}$  inch thick. It appears, then, that where the tubes were beaded over and ferruled, the variations of thickness of tube plate from  $\frac{3}{4}$  inch to  $\frac{1}{4}$  inch did not increase the holding power. The holding power of tubes simply fixed by the expander, and neither beaded over nor ferruled, is generally very much beyond any strain that would be put upon them by the working pressure of a locomotive boiler.

### THE DETERMINATION OF NITRIC ACID IN SOILS.

At a recent meeting of the Chemical Society, England, a paper was read on the above subject, from which it appears to be important to sample the subsoil as well as the surface, and to take the samples after dry weather. Boussingault found many years ago that after dry weather the surface soil of a kitchen garden contained nitrogen as nitrates = 29.2 per million; a few weeks later, rain having fallen, the nitrogen amounted to 1.2 per million. Experiments made still later, after dry weather, gave the quantity of nitrogen as 41.3 per million. It is necessary to dry the sample speedily, else nitrification proceeds; drying at 100° may occasion a loss of nitrates in proportion to the wetness and mass of the soil and its richness in organic matter. Drying at a high temperature also greatly increases the soluble organic matter in a soil. The plan adopted by Mr. Warrington, the author of the paper above mentioned, is to break up the soil in small pieces, place these in paper trays, and dry in a stove at 55°—the temperature at which nitrification is said to cease. Soils thoroughly dried in dry air seem to undergo very little change by keeping. The method commonly used to prepare an extract of the soil is to shake 500 or 1000 of soil with its own, or twice its own, weight of water, and take a known portion of the solution for analysis.

### A NEW WATER ELEVATOR.

Among the many interesting exhibits at the recent Naval and Submarine Exhibition, England, was a new water elevator, by means of which, it is stated, from 300 to 375 gallons of water can be raised per minute, the consumption of fuel being from 8 to 10 cwt. of slack per day, and the discharge pipe being 6 inches in diameter. The apparatus consists of a cylindrical chamber furnished at the lower end with inlet and outlet valves for water, and at the upper end with an inlet valve for air, while, in addition, there is a small steam valve which is opened periodically.

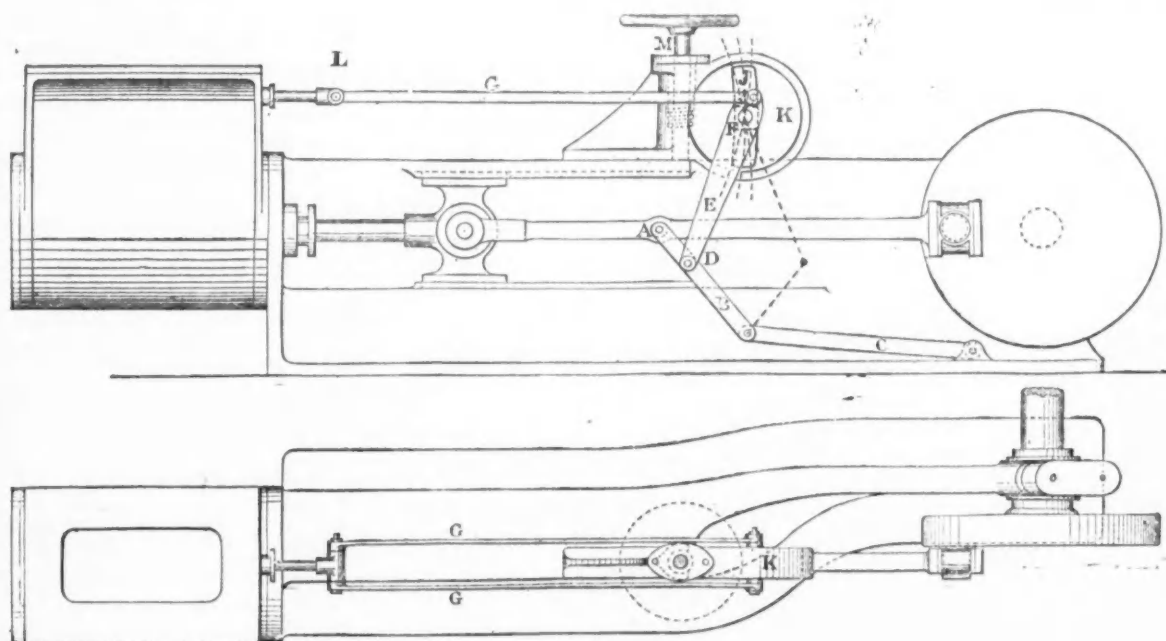


Fig. 1.—Horizontal Engine showing the General Features of the Joy Valve Gear.

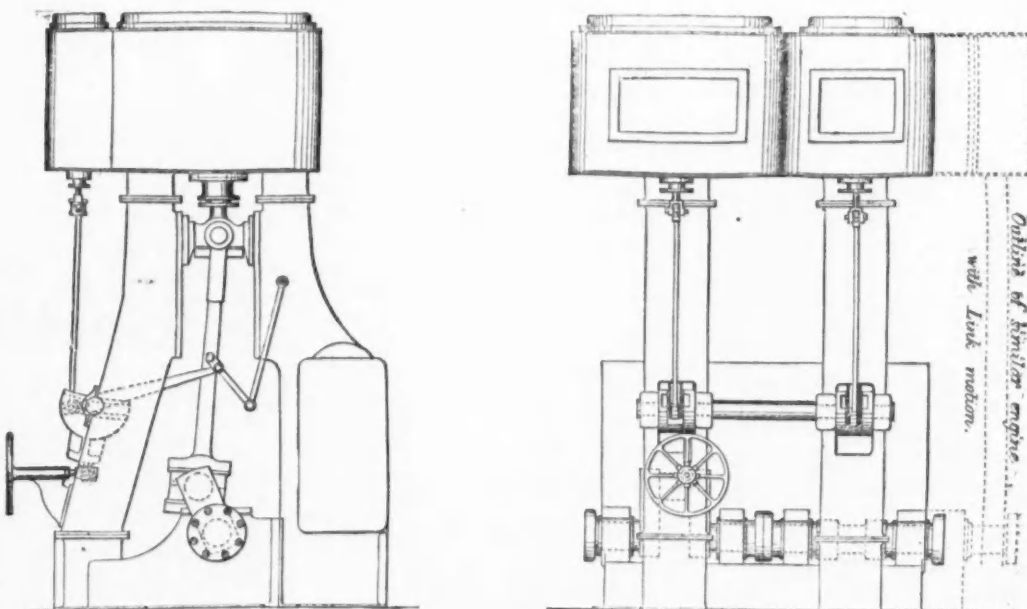


Fig. 2.—Application to a Marine Engine, showing Difference in Space Occupied Between Engines Equipped in the Old and New Way.

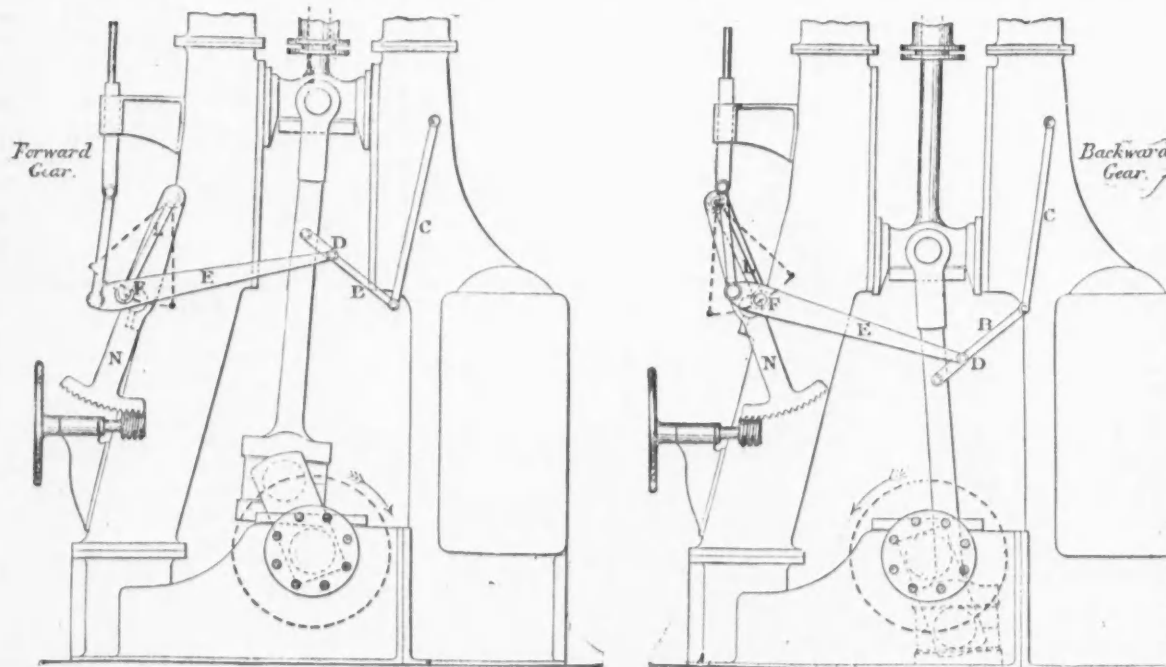


Fig. 3.—Example of the Joy Valve Gear Applied to a Marine Engine Employing a Radius Rod instead of Slide and Slide-way.

## THE JOY VALVE GEAR.

3. The valve is opened more rapidly, the cut-off is more prompt, and the exhaust port is opened more quickly than with a link-motion.

4. It is more accessible than the old gear; all the main working parts are on the outside under the direct inspection of the engineer, and within easy reach for examination, oiling and repair.

5. The motion of the valve is not, as in the link motion, limited by a given throw of eccentrics, but as the reversing depends on the angle to which the links Z are inclined, it is only necessary to carry them over a slight amount beyond the usual full gear, or, say, 75 per cent. cut-off, to give an extended opening to the port, which may be carried as far as to allow steam on the piston for 90 per

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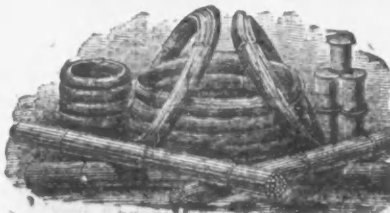
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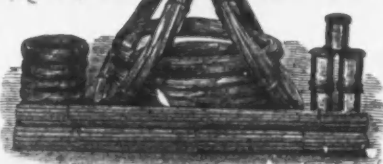
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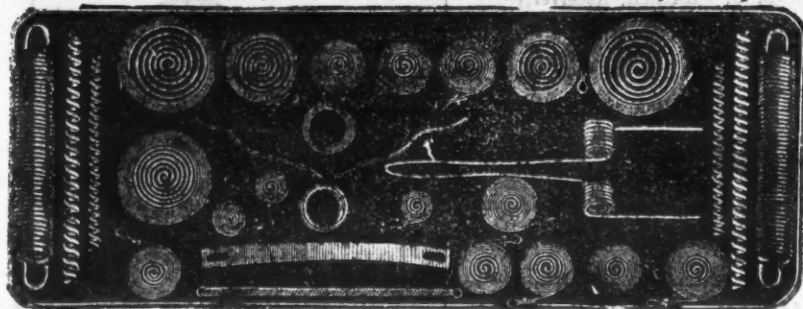
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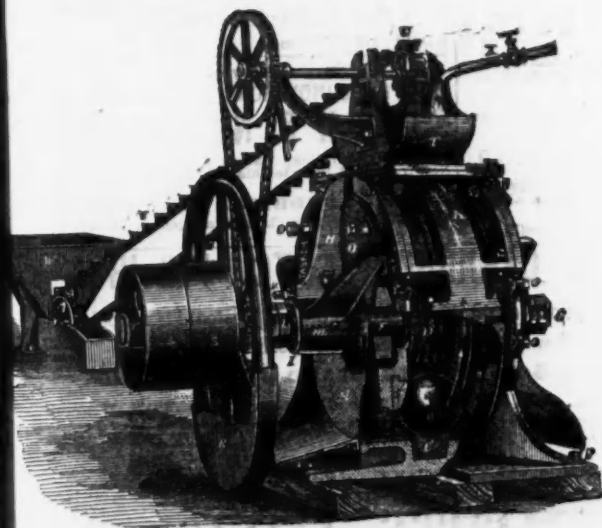
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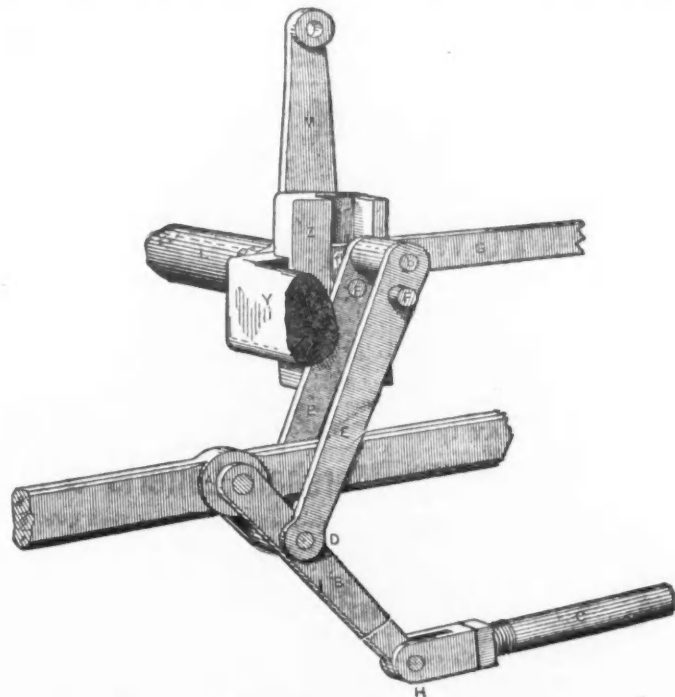
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ally for a brief interval by a rotating cam driven in any convenient way. It is filled by gravity, and when steam is admitted the inclosed water is forced through the delivery pipe. Partial condensation of the steam then takes place, and a fresh charge of water is taken in, while, at the same time, air enters through the air-inlet valve, the air so admitted appearing to form a kind of cushion between the water and the steam, and appearing to prevent condensation of the latter during the greater part of the delivery stroke. The entire arrangement is characterized by great simplicity, and further improvements which, it is said, will shortly be made, will render the apparatus still more economical and efficient.

**SOUNDS PRODUCED BY THE EFFECTS OF JETS ON DIAPHRAGMS.**

It was discovered in 1826 by a French engineer that when a plate was held normal to the axis of a jet issuing from an orifice under pressure, and at a certain height above the jet, it was repelled, whereas if held lower it was attracted. It was also found that there was a neutral point at which the

**A NEW FORM OF BICHROMATE CELL.**  
A new arrangement of the well-known bichromate of potash battery has been proposed by Mr. F. Higgins, of the Exchange Telegraph Company, London, which, besides yielding very powerful currents, is said to be very economical, inasmuch as the waste liquor of other bichromate batteries and the scraps of zinc left by the wasted zinc plates may be successfully utilized. The cell consists of an earthenware jar fitted with an overflow spout near the mouth, the scrap zinc being placed in a pool of mercury at the bottom of the apparatus. A copper wire insulated with gutta-percha, except at the foot, where it enters the amalgam of zinc and mercury, passes down the middle of the jar. Two carbon plates, arranged parallel to each other, are suspended from the mouth of the cell by a frame, and connected with each other by an electrode. A battery of these cells may be arranged by placing each one a little below the one above it on a suitable platform, so that the overflow of liquor from one cell may run into the next, thus causing a continual circulation of the wasted



The Joy Valve Gear.—Fig. 4.—Illustration of the Principle of Action.

plate was supported on the jet, and emitted an audible note as it oscillated about this position of equilibrium. It may not be without interest in this connection to state that M. Th. Vautier has recently succeeded in evoking very high sounds in this manner and registering them. With a jet of steam having a pressure in the boiler of  $4\frac{1}{2}$  atmospheres, and issuing from an orifice about 1 inch in diameter, against a plate  $\frac{1}{4}$  inch in diameter and .06 inch thick, held .007 inch from the orifice, a sharp note was obtained, the number of vibrations per second being about 7250.

#### SAFETY LAMPS.

It is a well-known fact that when a light is covered by wire gauze, as in a safety lamp, a large proportion of its lighting power is lost, and tests which have been made, the

fluid from the high reservoir to the lower one. This circulation prevents polarization of the plates and produces a powerful and steady current. The electromotive force of each cell is said to be from 1.9 to 2 volts, the internal resistance being a mere fraction of an ohm. It is estimated that from 7000 to 8000 foot-pounds of energy can be supplied by them at a cost of about 12 cents.

#### THE MUTUAL INFLUENCE OF METALLIC SURFACES.

Recent experiments of M. H. Pellat, communicated to the French Academy of Sciences, tend to show that when two metal surfaces are brought very close together a slight change takes place in the properties of the surfaces. The change requires a few minutes for its completion, and gradually disappears again when the disturbing metal is withdrawn. The phenomenon is detected by measuring the differences of potential between the electric strata covering the surfaces of the two metals in contact. The strongest effect of the kind is produced by lead and iron placed near another metal. Copper, gold and platinum give a distinct effect, but zinc does not appear to possess the power. It would seem from these experiments as if metals gave off at common temperatures a volatile substance which, when deposited on the surface of objects, modifies their chemical nature. This opinion of M. Pellat appears to be supported by the smell of metals, a subject investigated by the late Professor Rankine.

#### ALLOYS OF LEAD, COPPER AND ANTIMONY FOR SULPHURIC ACID CHAMBERS.

There has been much conflicting testimony as to the value of adding small quantities of copper or antimony to lead before rolling it into sheets destined for use in the construction of sulphuric acid chambers, and it will therefore not be without interest to give the results of experiments made by Mr. John Glover, a well-known English manufacturer of sulphuric acid, and Mr. N. Cookson. Mr. Glover had sheets rolled weighing 7 pounds per foot, and hung portions of them in the first of a series of chambers 30 feet from the inlet and 1½ feet from the top, keeping them in this way, for a period of 110 days. Unalloyed lead during that period lost 7½ per cent.; lead, alloyed with the proportions of copper and antimony given below, showed the following losses:

Alloy of Copper.	Per cent. of Loss.	Alloy of Antimony.	Per cent. of Loss.
Copper.	per cent.	Antimony.	per cent.
0.1	7.1	0.1	8.1
0.2	7.1	0.2	9.2
0.3	7.5	0.3	10.9
0.4	8.1	0.4	11.6
0.5	8.1	0.5	11.9
0.75	8.7	...	...

It will be seen from these results that such alloys are not to be recommended for the above-mentioned purpose. Mr. Cookson took commercially pure lead and alloys of the same lead with 0.1, 0.3, 0.5 and 1.0 per cent. of antimony, and heated them for different periods in acids of different strengths, determining in each case the loss which the plates sustained. Taking the extremes of 4 hours' boiling in strong acid, and 60 hours' exposure to weak acid at about 120° F., the following results were obtained:

Pure lead.	Boiling in strong acid. Per cent.	Long exposure to weak acid. Per cent.
0.1 per cent. antimony	4.32	0.49
0.3 per cent. antimony	4.53	0.59
0.5 per cent. antimony	5.86	0.75
1.0 per cent. antimony	9.00	0.78

Mr. Cookson stated as the result of his observations that probably the physical condition

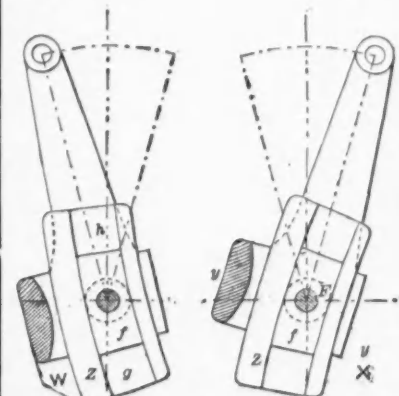


Fig. 5.—Diagram showing Different Positions of the Reversing Lever.

standard being a sperm candle consuming 120 grains per hour, have given the following results:  
Davy, naked..... = .398  
" covered..... = .146 = 63 loss  
Stephenson, naked..... = .466  
" covered..... = .131 = 64 loss  
Clanny, naked..... = .378  
" covered..... = .296 = 21 loss  
Mueseler, naked..... = .368  
" covered..... = .385 = 4 gain  
The contradictory result obtained in the last case is explained by the more perfect ventilation of the lamp considered, the flame, moreover, not being cooled as in other lamps. Safety lamps may remain in a stationary or slowly moving atmosphere of explosive gas for a considerable time without danger, the latter increasing, however, with an increase of speed; thus, a Davy lamp explodes when submitted to a speed of 6 feet per second; Clanny, 8 feet; Stephenson, 10 feet; Mueseler, 15 to 20 feet, according to the dimensions of the outlet of chimney and the position of lamp.

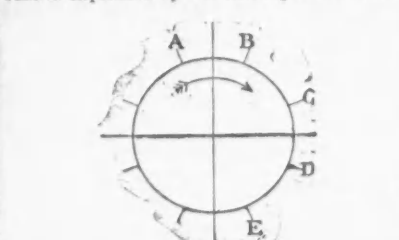


Fig. 6.—Path of Crank of Engine shown in Fig. 3.



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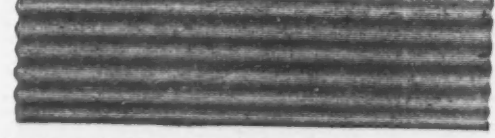
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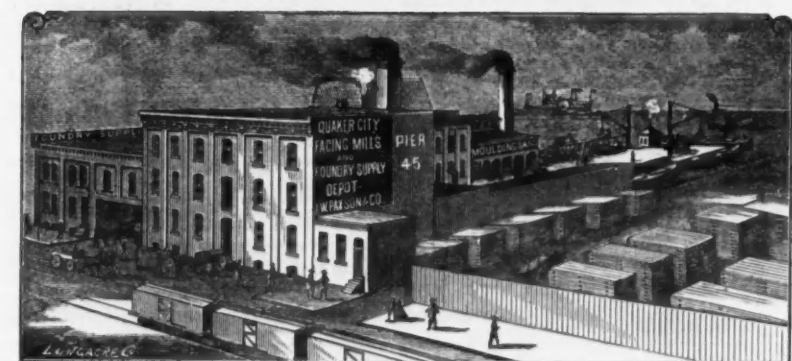
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of the lead had much to do with the subject.  
The whole question bearing upon this subject  
has, however, not yet been solved, and fur-  
ther investigations would, therefore, prob-  
ably yield additional interesting develop-  
ments.

WEIGHT OF CHARCOAL.

Mr. A. L. Tyler, of the Woodstock Iron  
Company, of Alabama, gives the following  
data concerning the weight (per bushel of  
2688 cubic inches) of charcoal made from  
various wood:

	Pounds.
Oak.....	20.95
Mixed oak and pine.....	19.42
Pine.....	17.47
Pine (light).....	16.82

Transferring these weights to those of bushels  
of 2748 cubic inches, the Journal of the Char-  
coal Iron Workers finds the annexed results:

	Pounds.
Oak.....	21.48
Mixed oak and pine.....	19.94
Pine.....	17.85
Pine (light).....	17.19

A NEW GAS BURNER.

A new burner has been constructed by M.  
Clamond, and is based on the principle of  
burning the gas at a temperature of from  
800 to 1000° C. The combustion takes place  
in the interior of a cone of magnesia of  
special manufacture, which, under the influ-  
ence of the heat, becomes incandescent, a  
light being obtained which is of great fixity  
and brightness. The magnesia used resists  
the high temperature for about 52 hours,  
after which time it must be replaced, the  
operation of changing being performed very  
quickly.

THE RECOVERY OF SULPHUR FROM ALKALI  
WASTE.

Mr. A. M. Chance, of Birmingham, Eng-  
land, recently read a paper bearing the  
above title, before the Chemical and Physics  
section of the Society of Arts, quoting  
statistics with regard to the imports of  
brimstone and pyrites into Great Britain,  
and showing that if 350,000 tons be taken  
as the amount of pyrites actually imported  
for the manufacture of soda from 80 to 90  
per cent. of the sulphur was lost in the  
alkali waste. The expense attending this  
loss had hitherto been regarded by manufac-  
turers as part of the cost of production, but  
recently the method known as the ammonia-  
soda process has been so successfully estab-  
lished on a large scale that soda ash is  
being produced by it with but little expense,  
and thus the recovery of the sulphur from  
alkali waste, as a means of cheapening the  
cost of production by Leblanc's process, had  
become of vital importance. Mr. Chance  
referred to that of Messrs. Schaffner and  
Helbig as seeming to offer a satisfactory so-  
lution of the question, and said that the  
chemical combinations discovered and ap-  
plied by Messrs. Schaffner and Helbig fully  
realized the conditions claimed for them—  
that from 90 to 95 per cent. of the sulphur  
in the vat waste might be recovered in a  
commercial form; that practically the whole  
of the calcium compounds were also recov-  
ered, principally as carbonate of lime, and  
that the reagent by which these remarkable  
results were obtained was itself recovered,  
with the exception of the unavoidable losses  
due to the manipulation of the process.

A NEW MAGAZINE GUN.

A new magazine gun, which has recently  
been brought out in Europe, and which is  
said to possess great accuracy at distances  
as great as 900 yards, is described as follows:  
A magazine containing 23 cartridges is  
placed at the end of the cross; the car-  
tridges are carried from the magazine to  
the breech, and inserted in the barrel by  
means of a distributor, while a safety bolt  
in front of the breech block closes the mag-  
azine as soon as one cartridge leaves it. A  
small lever is placed underneath the gun,  
which, upon being moved by the left hand,  
releases a fresh cartridge. The magazine  
may be closed at any time, and the gun  
loaded and fired as an ordinary breechloader,  
the cartridges in the magazine being kept as  
a reserve in case of need. When tried sim-  
ply for rapidity of fire, it is stated that a  
rate of one round per second was attained.

IMPROVED WINDING GEAR FOR MINES.

Important improvements have recently  
been introduced by Mr. John Craven, of  
Wakefield, England, in the form and arrange-  
ment of winding gear for mines, the im-  
provement consisting mainly in obviating  
the necessity of coiling ropes round the  
drums usually employed, and so removing  
the danger and expense arising from the  
great wear and frequent injury of the ropes  
by one coil chafing against the other. In  
order to effect these objects, the inventor  
employs a single winding rope, an upper set  
of grooved headgear pulleys, and a lower set  
of grooved winding pulleys, each consisting  
of two pulleys and an intermediate grooved  
pulley between the two sets. The rope is  
attached at one end to one of the cages,  
passes over one of the headgear pulleys,  
under one of the winding pulleys (to which  
the motive power is applied), and back  
over the intermediate pulley, and then under  
the other winding pulley, and thence over  
the other headgear to the other cage, to  
which the end of the rope is attached. This  
arrangement is designed to give greater  
durability to the rope, and to obviate all ten-  
dency to slipping of the rope, as in propor-  
tion as the weight of the load is increased  
the adhesion of the rope is augmented. The  
bearings of the intermediate pulley may be  
carried in a movable frame, either inclined  
or otherwise, so as to admit of the pulley  
being adjusted as required, in order to main-  
tain the rope taut. The following specific  
advantages are claimed for the invention:  
No chafing of rope as in the ordinary system  
of drum, so that the ropes last longer; re-  
duction of work for the engine to do in  
starting; reduction of strain upon the engine,  
&c., in stopping; speed, instead of being  
obtained by a large diameter of drum, is got  
from the engine running quickly; a smaller  
engine is required than with ordinary gear,  
owing to the comparative lightness of the  
winding pulley; the winding pulleys have  
only one groove each, and are of very small  
weight, comparatively; saving in first cost,  
the engine house being much narrower, and  
only one rope required instead of two; great  
adhesion, no slip occurring between the rope  
and the pulleys.

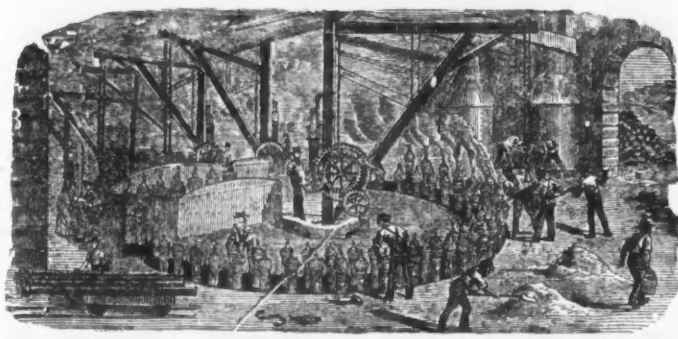
CAMEL HAIR BELTING.

A machine belting made of woven camel  
hair, or of hair known as camel hair, is



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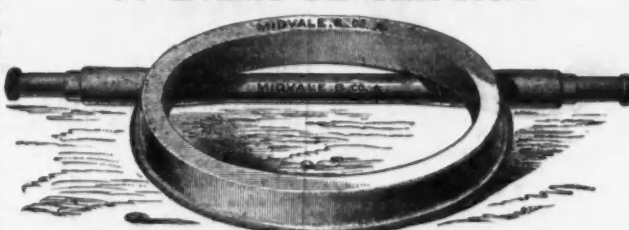
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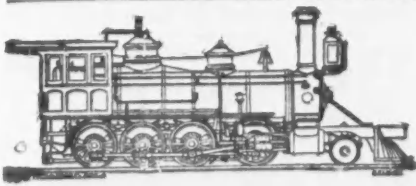
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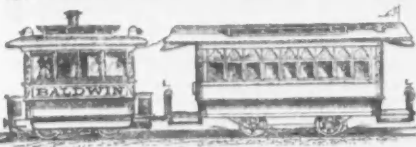
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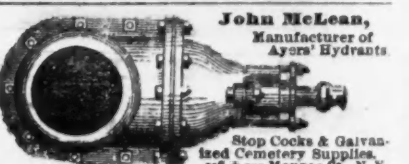
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from 1/4 to 2 1/4 inch width of jaws, and in weight from 1 to 5 lbs. Over 200,000 made and sold in the past four years, with continually increasing demand. We are the only ones making a line of cheap small vises in America. We make also Farmers', Machinists' and Coachmakers' Vises, and other goods. Send for Price List.

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Makes a Full Line of  
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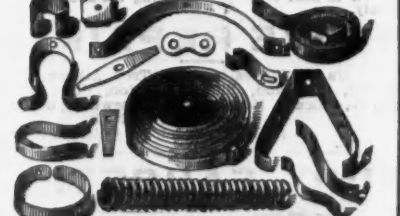
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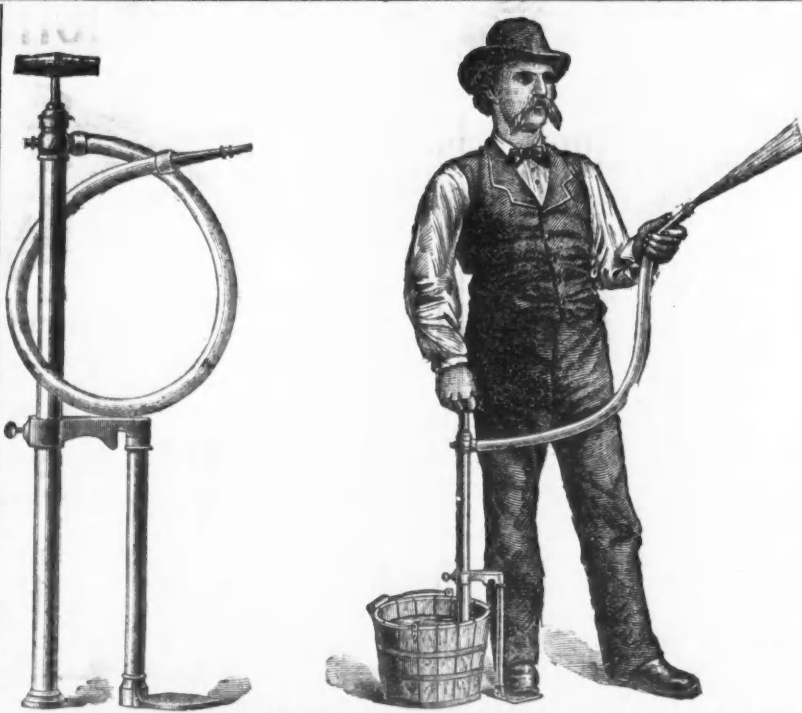
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**WE ARE THE ORIGINAL AND FIRST INVENTORS OF THIS STYLE OF PUMP, AND HOLD VALID LETTERS PATENT ON SAME, AND ANY STATEMENT THAT IT HAD BEEN IN THE MARKET PREVIOUS TO OUR MANUFACTURE OF SAME IS OF COURSE ABSURD AND WITHOUT THE SLIGHTEST FOUNDATION IN TRUTH.**

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**SKINNER'S PATENT COMBINATION CHUCK.**  
Universal, Independent and Eccentric.  
By sliding a stud on the back of chuck it is instantly changed from Universal to Independent, and vice versa. Each Chuck is guaranteed perfect. All parts are made interchangeable. Only the very best materials used in their construction. Reverse or special jaws furnished when desired.  
We also manufacture  
Plain and Ornamental Butts,  
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Write us for prices.  
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MALLEABLE, FINE GRAY IRON AND STEEL CASTINGS made from patterns to order. Special attention given to Tinning, Bronzing, Coppering, Japanning and Fitting. A large line of Carriage and Wagon Castings constantly on hand for the trade.

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**SEAMLESS DRAWN BRASS & COPPER TUBES,**  
BRIDGEWATER HORSE NAILS, 3d. FINE NAILS,  
Tack Plates and Forgings of Every Description.  
**NAHUM STETSON, Jr., Agent, 73 Pearl Street, New York.**

being manufactured and used in cotton mills in Manchester, England. A test made in London with a camel hair belt 6 inches wide and 27 inches thick showed a breaking strain of 9181 pounds, with an extension at the rate of 2.68 per cent. at 1200 pounds; 5 per cent. at 2400 pounds; 6.60 per cent. at 3606 pounds, and 13.07 per cent. at 4800 pounds. It is claimed that this belting slips less on pulleys, does not deteriorate to anything like the same extent as driving belts of vegetable fiber, and is thoroughly water-proof and not affected by variations in temperature.

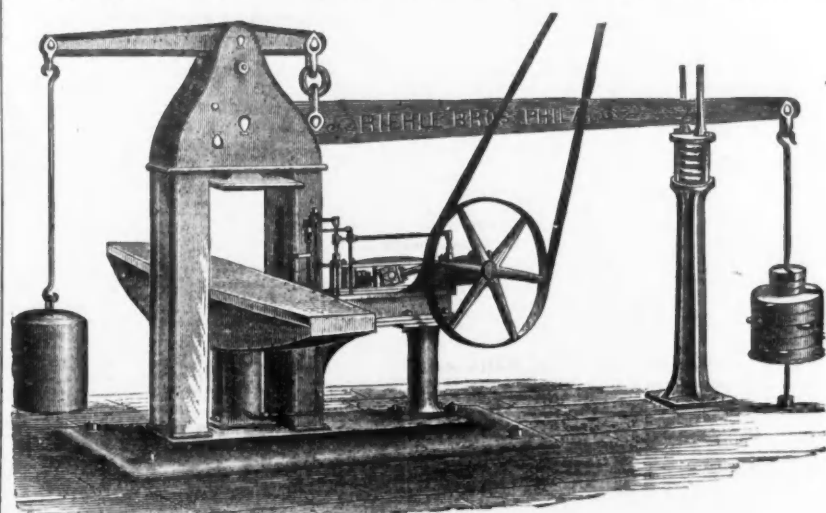
## BAKER'S NEW CAR HEATER.

The desirability of providing an effective method of heating cars, free from objectionable features, and which would avoid the annoyance of stoves and danger accompanying their use in case of collision, has long been recognized. A new car heater, invented by Mr. W. C. Baker, complying with the various requirements will, therefore, be justly appreciated. The general design is to apply underneath the car a low-pressure steam heater allowing the supply of heat to be regulated at will. The apparatus is provided with a safety valve, fire regulator, automatic air valve and every safeguard that may contribute to its acceptability. The apparatus consists of a semi-spherical boiler provided with a slightly curved top, and inclosed in a combustion chamber. The water is supplied through a pipe so arranged that only the de-

vance averages about 32 feet daily, thus exceeding the average made with the St. Gothard by about 18 feet. The boring is expected to be completed before the end of 1893.

## Hydraulic Spring Testing Machine.

The accompanying engraving illustrates a new and improved testing machine manufactured by the Philadelphia Scale and Testing Machine Co., Messrs. Riehle Brothers, proprietors, which is particularly calculated for testing springs. Its capacity is 30,000 pounds. The upper table bears against a system of weighing levers, and is counterbalanced by the weight on the end of the beam. The lower table is extended, and will admit of a spring 5 feet in length being tested. When the spring is in position the plunger under the lower table is moved upward and bears against the upper table. The amount of pressure is indicated by weights. The lower table is forced up by the action of the pump attached to the machine. The pump continues in action all the time while the testing is in progress. There is a lug set at a fixed place, so that when the spring being tested has been compressed sufficiently it engages with a corresponding projection on the frame of the machine. This causes the fluid to be diverted from the tube communicating with the plunger, and turned



Hydraulic Spring Testing Machine, Manufactured by Riehle Brothers, of Philadelphia.

sired quantity can run into the proper receptacle, while the water can be emptied through an elastic tube forming a syphon. The outside end of the water pipe is closed by a small plug, and by turning it a groove is opened, indicating the height of water in the boiler, and thus answering the purpose of a gauge-cock. An automatic draft regulator, which controls the pressure of the steam, can be set permanently or adjusted to open or close the draft of the fire, thus regulating the heat at pleasure. The ash pan is of cast iron and distinct from the parts that support the boiler. The ash door is of a size that admits of easy access to the fire, cleaning the ashes, shaking the grate, and renewing the grate. The coal chutes, which are placed one each side of the car, are inclined at such an angle that they will act as self feeders to the fire. They hold a sufficient quantity of fuel to provide in ordinary winter weather for a trip lasting from 24 to 36 hours, but if required, bunks capable of holding larger quantities may be attached to the cars. The connecting steam pipes that are outside are thoroughly protected by weather-proof materials, as well as the boiler and smoke flue. The radiators usually consist of 2 1/2-inch steam pipe, and run close to the truss plank the whole length of both sides of the car. A temporary monitor, in the form of an accurate steam-pressure gauge, is placed in the car and always indicates the exact pressure of the steam and the condition of the fire. It also informs the attendant when the fire needs attention. The mechanical arrangements are of such a character that no injury can occur from freezing, and safety from fire is assured. The fire cannot burn the car even in the worst of accidents, because in case the car should receive a shock sufficient to break it, the ash pan, a separate piece from the rest, is so attached that it would instantly fall from the boiler and carry all of the fire with it. The new heater, having but eight gallons of water to heat, can have every portion of the radiator heated at exactly the same temperature in about 30 minutes' time, and it can be cooled just as readily. It has given great satisfaction wherever it has been tested, and a prominent railroad official is said to have declared that "it is undeniably the car heater of the future."

## A NEW BOILER PROTECTOR.

A number of experiments were recently made in Birmingham, England, in order to introduce to popular notice the Barbe safety valve, invented by M. J. Barbe, an engineer and boiler maker of Belgium, for the prevention of boiler explosions. The valve, which is attached to the lowest point of the boiler, and is applicable to any kind of boiler, consists of an inverted safety valve, without spindle or feathers, in order to obtain the best and surest relief possible in case of a sudden increase of pressure. When in ordinary use the valve is loaded from 15 to 20 pounds above the working pressure, so as to allow for the fluctuations of steam, but always within the strength of the boiler and slightly in excess of the pressure required. In case the safety valves on top of the boiler do not act, it liberates the water and prevents any further rise of pressure. One of the experiments consisted in making a boiler red-hot and injecting cold water into it, the result being that in about 1/2 minute a pressure of 50 or 60 pounds was generated with about one gallon of water. Although all the valves were equally loaded, the Barbe valve always responded first, thus giving conclusive evidence of its utility and proper action.

According to reports from Geneva, the boring of the Arberg tunnel is proceeding with unexampled rapidity. The rate of ad-

back into the reservoir. The lower tube then returns to its original position. The extreme length of the machine here illustrated is 11 feet, the extreme height 5 feet 8 inches, the width 5 feet, and the total weight about 5300 pounds. The compression surface at the top is 16 by 16 1/2 inches. The corresponding surface below is 16 1/2 inches by 5 feet 6 inches, admitting the largest size of elliptical springs in common use. The space between the compression tables is 1 foot 10 inches. The dynamic motion is 1 1/4 inches. The motion of the plunger is 10 inches. The whole apparatus is substantially constructed of iron, brass and steel, and is finished in the best manner.

**The Expansion of Rails.**—An interesting case of some importance to railway companies was recently decided in Scotland, a traveler on the Caledonian Railway having sued the company in consequence of injuries sustained through a train leaving the rails. The principal defense of the railway company was that on the day of the accident the extraordinary heat in the district considered caused the rails to expand and get distorted so much as to cause the engine to leave them. The accident, they claimed, was thus caused through circumstances over which they had no control, and for which they were not responsible. Sheriff Lees, of Glasgow, in an interesting note, gave an account of several cases of a somewhat similar nature that had occurred on different roads in Great Britain, and, after due consideration, awarded the plaintiff £250.

An improvement has been proposed in connection with street cars, and if adopted will undoubtedly meet with the approval of the public. The apparatus in question consists of a brass tube faced with glass, and running the entire length of the car, one end being raised some inches higher than the other, and the lower end terminating in a regular fare-box. Fixed in the tube from the top, at intervals of about 18 inches, are openings large enough to receive coins, which, when dropped into any of these openings, roll quickly down the inclined plane and enter the fare-box in full sight of the driver. The tube or conveyor cannot become choked, as the regular jolt of the car is more than enough to insure its advance. While the Third Avenue Company, for the present, will place the "conveyor" only upon the bobtail cars of their 125th street line, eventually it may be adopted on every car of the company. It is inexpensive, and it is claimed that its use on the "two-horse" cars would prove greatly beneficial, particularly as it would relieve the conductor of work which now takes up much of his time, would enable him to remain on the platform continually to serve passengers more readily, and care for the interests of the company far better than at present. The "conveyor" has been adopted in Pittsburgh by several lines, and will probably be introduced on other lines besides the Third Avenue, in this city.

According to M. Paul Trasenster the quantities of iron and steel produced in Europe and America were 19,700,000 tons of pig iron in 1881, against 18,313,000 tons in 1880; manufactured iron, 7,608,000 tons in 1880, the latest date given, being an increase of nearly 100,000 tons on 1879. The total of steel ingots for 1881 is estimated at 5,220,000 tons. The increased demand is almost entirely due, says M. Trasenster, to the growing requirements of England, France and the United States; the latter, however, he believes to have reached its maximum.



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Superior Hand-Cut  
**FILES AND RASPS,**  
MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.  
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Superiority acknowledged wherever used, sold or exhibited.

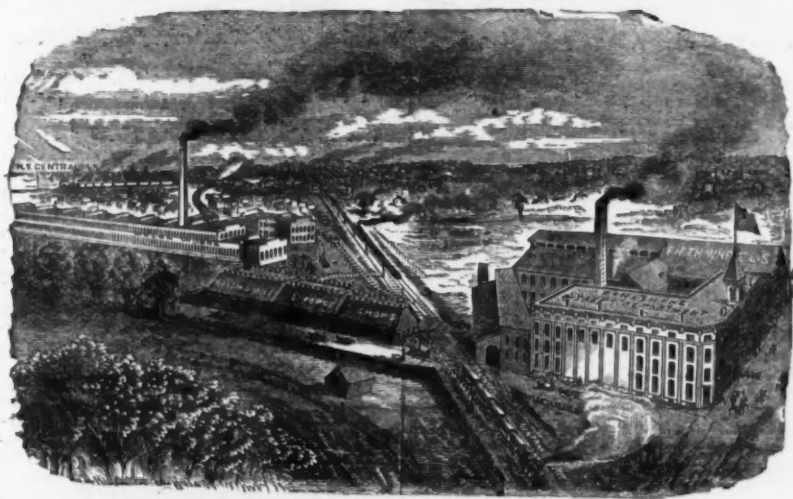
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OUR STOVE PLATE FACING IS INDORSED BY THE LEADING STOVE FOUNDERS

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A. H. EATON, Superintendent.

**SHOVELS, RIDDLERS, BRUSHES, & C.**

**WHITEHEAD BROS.**

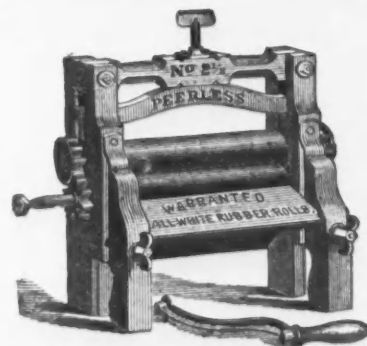
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515 and 517 West 15th St., New York.

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**CLOTHES WRINGERS.**

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Drill,  
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Flat Wood,  
Gang-Edger,  
Ginsaw,  
Gulleting,  
Half-Round,  
Half-Round Wood,  
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Hand Equaling,  
Handsaw Blunt,  
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Handsaw Taper, single cut,  
Handsaw Taper, double cut,  
Handsaw Taper, slim,  
High Back,  
Hook-Tooth,

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Lead Float,  
Lightning,  
Machine Mill,  
Mill,  
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Mill Pointing,  
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Round,  
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Baker's,  
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Butchers' Steels, Improved,  
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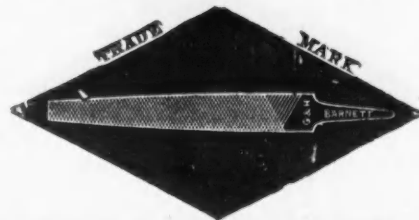
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**Black Diamond File Works.**



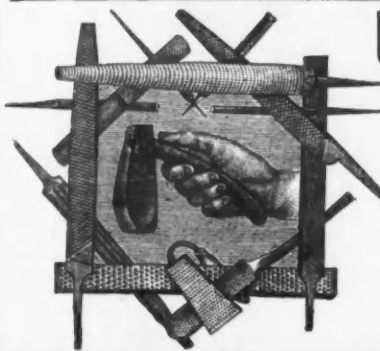
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All descriptions of Files made to order. Price List mailed on application. Established 1863.



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With all the requisite facilities to produce a first-class article, we are enabled to offer Files that will give entire satisfaction.

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These machines have long been in use in this country and in Europe, and are unexcelled for perfection of work and labor saving. We now offer them with the latest improvements, and will apply them to forging and grinding other articles of tapering or otherwise irregular form.

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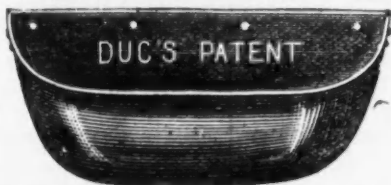
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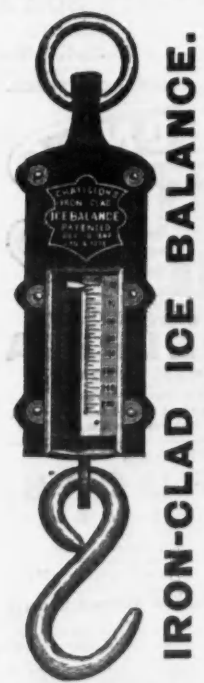
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The movable roll is formed upon a vertical shaft mounted in bearings fixed to a movable carriage fitted to a slide in plain guide-ways in the foundation plate, and a movable standard is also fitted to a slide in a similar manner, in ways formed in the foundation plate. To this standard is hinged a fork lever frame, the outer end of this lever being fitted with a bearing in which the upper end of the shaft is seated, thus sustaining it against the rolling pressure, as in the case of the main shaft. The sliding standard is connected by means of side bars to the slide carrying the movable roll, and these side bars are each formed at one end with T heads, which enter recesses in the sliding carriage. In the standard supporting the fixed shaft are seated the cylinders of two hydraulic rams, which at their outer ends bear against the sliding standard carrying the fork lever. When the cylinders are changed the sliding standard is caused to move in a direction toward the right, and by the action of the slide carrying the movable shaft the latter is also caused to move in the same direction, thus approaching the fixed roll. As the fulcrum of the lever which carries the top bearing of the loose roll is fixed to the sliding standard carrying the fork lever, this lever moves also in unison with the standard and carriage, so that the efficiency of the bearing is not interfered with. In the carriage supporting the movable roll is contained the cylinder of a hydraulic ram which abuts upon the body of a ram cylinder connected with a sliding cross-head, which in turn is connected by rods with the slide carrying the movable roll. When this ram is forced outward the slide carrying the loose roll is drawn to the left, whereby the rolls are separated, and when the T heads of the bars take their bearings in the recesses in this slide, the standard carrying the fork levers is compelled to move in unison. The ram connected with sliding cross-heads is employed to move the slide after the fork lever has been lowered until the shaft takes the bearing of the fork lever, and also to move the slide away from the fixed roll for the introduction of the metal to be rolled, or subsequently for the removal of the finished rolled ring. When the ram in connection with the sliding cross-heads is in action for moving the slide carrying the loose roll in the direction to the right, and in order that this movement may take place in unison with a corresponding movement on the part of the standard, clearances are formed for the T heads of the side bars, and when the slide is so moved the upper end of the shaft is released from the bearing. The independent action thus permitted to the slide is such that after this movement the fork lever may be turned upon its fulcrum so as to remove the bearing on the end of the lever out of the way, and, in order that the lever may be readily tilted up, a hydraulic cylinder is provided to the right of the mill. Fixed shafts, bolted to the foundation plate, carry two vibrating frames, each of which is formed with arms carrying spindles, and upon each frame there are mounted three guide rolls. Upon these frames are formed worm spur quadrants, which gear with worms fixed upon a shaft mounted in ordinary bearings. This shaft is turned by means of a hand wheel, and when in action causes the vibrating frames to revolve upon their shafts. The worm teeth of the two frames are made right and left, so that they turn in opposite directions, and all the rollers are thereby moved to or from the main roll simultaneously. The top of the foundation plate forms a level table upon which the work can be moved, but in order to facilitate this operation, while the iron is being rolled, carrying rollers are provided which revolve in recesses formed in the foundation plate, but projecting slightly above its surface. These rails are provided with extended axles, which are connected by means of bevel gearing with connecting driving shafts. The fixed roll is formed with top and bottom flanges, and the movable roll is a plain cylinder. When in operation, the metal to be rolled is formed into a hollow cylindrical shape, so as to slip into position over the loose roll while the fork lever is tilted up. The lever frame is then lowered, and the rams attached to the standard on the right are forced outward, bringing the loose roll against the inner surface of the metal, when the rolling operation, which is shown in plan, commences. The worm shaft is moved in the direction which will so move the vibrating frames as to bring the guide rollers into contact with the metal and support the ring, being rolled so that its center is kept in the center line of the two rollers. When the ring has been rolled to the required diameter, the water is shut off from the hydraulic cylinders of the ram attached to the standard, to arrest the movement of the sliding carriage, while water is admitted to the hydraulic cylinder connected with the slide cross-heads, and this ram being forced outward, the sliding carriage is drawn backward so as to withdraw the roll from the ring. The hand wheel attached to the worm shaft is then turned in the direction which will withdraw the guide rollers from the ring, water is admitted to the cylinder in the movable slide, and the upper end of the loose shaft is moved out of bearing. The fork lever being then tilted up, the ring is free to be removed from the machine. The rolls,

it may be added, are arranged to be changeable for other rollers, so that various forms of rings, either conical, flanged or plain, may be produced.

### The Strength of Wire Ropes.

Among the different subjects upon which attention was bestowed by the French commission appointed in 1878 to investigate the causes of accidents in mines, the strength of wire ropes was not the least important. The report of the commission on this subject was recently published under the auspices of the Government, and constitutes an elaborate document, covering not only researches made in France, but giving observations made in England, Belgium and Germany. New iron wire ropes, during the first days of their use, stretch from 1 to 2 per cent., and when nearly worn out they undergo slow and continuous elongation. Many engineers and manufacturers profess to have no doubt that by vibration the iron of ropes becomes hard and breaks easier. Other manufacturers have produced the results of tests, which, according to them, prove that the wire of rope which has been in use shows the same tensile strength per unit of section. They freely acknowledge that the wires of an old rope have not each the same strength; but they claim that this is only the result of a decrease in the section due to abrasion and rusting. The results of some experiments submitted do not entirely bear out this argument. Thus, a rope consisting of six strands of 18 wires each (having a diameter of 0.0788 in.) was used 10 months and twenty days, and during that time had been hoisted and lowered 54,360 times, drawing 90,509 tons from a depth of 361 feet, and had been wound around the hoisting drum 233,235 times. The average result of the tests of the 18 wires of a strand in the new and in the old ropes was as follows:

Iron wire rope.	Total tensile strength of wire—Lbs.	Tensile strength per sq. in.—Lbs.	Elongation at rupture—Per cent.	Elastic limit—Per cent.	No. of bends
New.....	494.5	103,437	1.016	0.498	7.0
Old.....	385.8	86,055	0.258	0.258	6.4

The diminution of the elasticity in the wire of the old rope shows that the iron has undergone a molecular change. It may be concluded that the tensile strength per square inch is really greater than above given, since rupture generally occurs at the point of smallest section of the wire, and since the sectional area is not uniform throughout its length. The annexed table gives the results of a second set of experiments, in which a number of the wires of the new rope were tested a second time, to determine the effect of the previous rupture; the diameter of the wire was .0709:

Wire rope.	Tensile strength of each wire—Lbs.	Tensile strength per sq. in.—Lbs.	Total elongation—Per cent.	Elastic elongation—Per cent.	Number of bends
New, first test...	434.7	113,792	1.258	0.455	9.9
New, second test...	437.6	114,045	0.670	0.500	7.9
Old.....	292.1	78,233	0.402	0.378	...

In this case the wire was not alone diminished to one-half, but the tensile strength, too, suffered appreciable reduction, which cannot be attributed as easily to errors in determining the section of the wire. This is shown by the results of the tests of the single wires. In the wires of the new rope, the difference between the best and the poorest was 15 per cent. of the average tensile strength, the poorest being 7 per cent. lower than the average. In those of the broken rope, the range is 24 per cent. But even the worst single wire had only a decrease of 41 per cent. in the tensile strength, as compared with the average of the new rope.

The following figures were obtained by testing wire ropes at Creusot:

Specimen No. 1.	New wire.	Seven months' service.	Eleven months' service.
Total tensile strength.....	704	605	495
Percentage referred to new rope.....	220	189.2	156.2

This rope lasted 21 months, and the figures express the average tensile strength in pounds.

Specimen No. 2.	New wire.	Five months.	Nine months.	Thirteen months.	Eighteen months.	Twenty-five months.
Tot tensile strength in pounds.....	721	708.4	686.4	616	378.4	412.6
Percentage referred to new rope.....	226	217.8	187	165	114.4	121

Great Paul.—The work of lifting the new bell at St. Paul's, London, was completed on May 31st, the actual operation having taken some 15 hours. The huge bell was formally dedicated to the service of the church on June 3d, and its first strokes have satisfied all who heard it of its sweetness of tone and impressiveness of effect. The bell was cast in November, 1881, and on May 11th of this year was brought by road a distance of about 112 miles on a specially constructed trolley, and was delivered at the Cathedral on May 22d. The arrangements for getting the bell into position had been very carefully planned, and, although in some places there was literally not an inch of space to spare, no hitch of any importance occurred, and the raising was effected without any serious difficulties. An ingenious method has been adopted to provide for the smooth working of the gudgeons projecting from the ends of the headstock like the trunnions of a gun, and upon which the whole mass will rest and swing. The gudgeons are of wrought iron, are 5 1/2 inches in diameter and work in gun metal bearings; and at short distances apart, over the whole surface of the bearings, holes have been bored, being about 1/4 inch in diameter and provided with plugs of metalline. The wear due to friction will ultimately call the action of this soft compound into play, and proper lubrication will thus be effected without serious difficulties.

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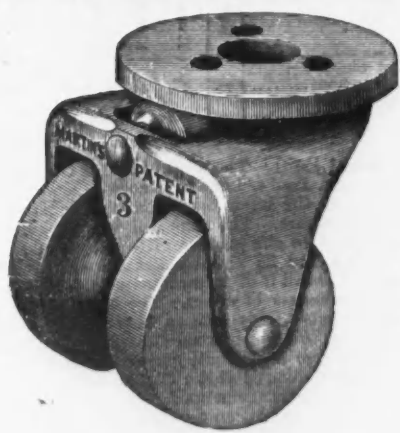
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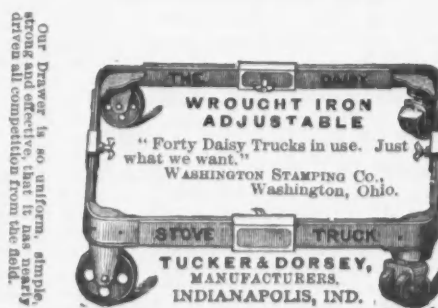
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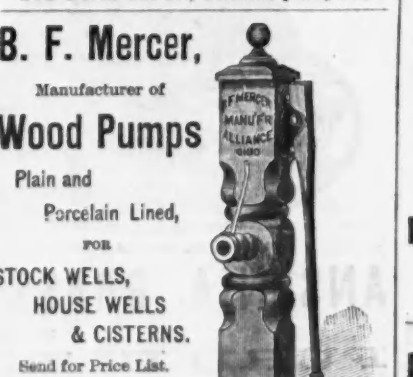
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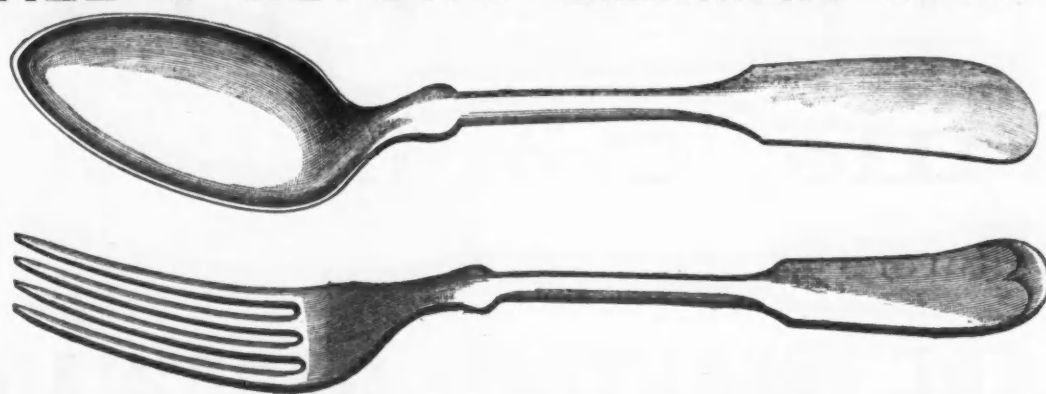
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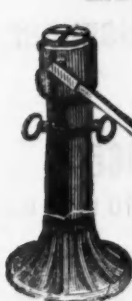
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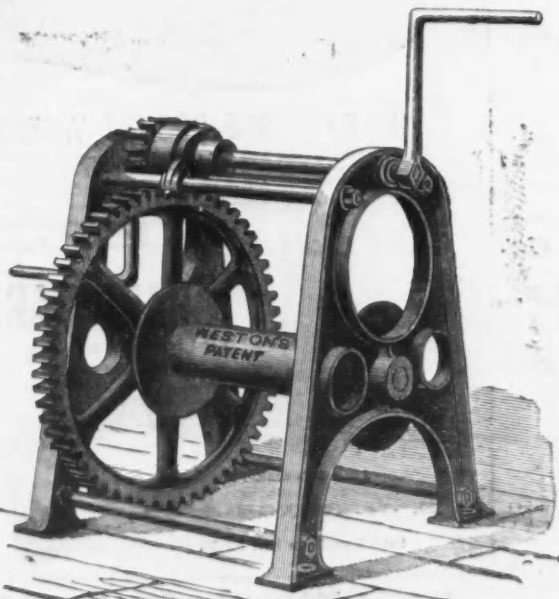
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In the Weston Crab the handles cannot recoil on the operator. To lower the load it is necessary to wind the handles backward. It will continue to descend so long as this is done, but will at once come to rest automatically if the handles be let go either in hoisting or lowering.

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CANNOT  
Fly Back.



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## Lehigh University.

We have received the register of the Lehigh University, of South Bethlehem, Pa., which gives a general idea of the aim and character of the institution, the requirements for admission and the methods of instruction adopted. We would call special attention to the School of Technology, which includes four distinct courses—civil engineering, mechanical engineering, mining and metallurgy and chemistry. The course in civil engineering comprises the higher branches of applied mechanics and mathematics, together with the principles of construction and exercises in drawing and designing. The theoretical principles are in all cases illustrated by examples from actual engineering practice, and practical operations connected with the location and survey of roads, canals and railroads are fully illustrated in the field. In the department of mechanical engineering the studies pursued are such that the students may obtain the practical engineering data which they will most need when beginning their work as mechanical engineers. During the course there are frequent visits of inspection to engineering works, and it is intended that each of these excursions shall have some definite purpose in view, which must be fully reported by the students.

On account of the great number and scope of the studies necessary to the completion of the course in mining and metallurgy, it is five years in length, comprising courses in mining, metallurgy, geology, mineralogy, qualitative and quantitative analysis, blow-pipe analysis, topographical and mine surveying and drawing. The course in chemistry includes thorough instruction in theoretical and applied chemistry in their various branches, and the laboratories are said to be unsurpassed in excellence by any similar establishment in the country, being supplied with all modern improvements.

The University library, which was erected in 1877, contains 25,000 volumes, and includes many valuable works. An astronomical observatory in connection with the institution offers considerable advantages to students in practical astronomy, both in the use of the instruments and in actual observation. The institution is freely opened to pupils from every part of the country and the world, and all educational facilities are provided without charge.

**The Unfinished Monitors.**—The Naval Appropriation bill as reported gives to the Bureau of Steam Engineering \$1,000,000, to be used in building and fitting the turrets and pilot house of the iron-clad Miantonomah, in launching to the best advantage the four other uncompleted monitors, and in completing the engines and machinery of two of them. The work upon the Miantonomah, specified in the bill, will cost about \$275,000. Before the four uncompleted monitors can be launched shafts must be put in and other work done which will cost about \$300,000. There will remain about \$425,000 available for completing the engines and machinery of two of the four. This will be sufficient for any two of them according to the estimates furnished by the department. The Puritan lies in Roach's yard at Chester, Pa.; the Amphitrite in the yard of Harlan & Hollingsworth at Wilmington, Del.; the Terror, in the yard of Cramp & Sons, at Philadelphia, and the Monadnock in Phineas Burgess's yard at Vallejo, Cal. Two of these must be selected, if the bill should pass in its present form, and the two unlucky contractors whose vessels are not chosen will, in that case, be dissatisfied. It is said that the department does not wish to be compelled to make the choice. If the bill should pass the House in its present form, an attempt will be made in the Senate to strike out the provision limiting expenditure to two, and probably to extend the appropriation so as to include the whole four. It is expected that this part of the bill will meet with determined opposition in the House, and that the management of the Navy Department, while Mr. Robeson was Secretary will be severely criticised.

**Steam Tramways in Paris.**—The Paris Tramway Company have given steam a thorough trial, and, after five years' experience, have reverted to the old system of employing horses. The result of the prolonged trials has been to show that steam is dearer than horse power. The engine requires a driver and stoker, whose pay is greater than two of the old drivers or coachmen. Then the fuel and maintenance of the engines in order were costly, while the original outlay in capital is about the same as that required to keep up the requisite stud of horses. Moreover, hardly a week, often not a day in the week, passed without some accident on the steam line, which proved very costly to the company and led to complaints being addressed from various quarters to the authorities. Hence the latter at last issued a prohibition against the further employment of steam, and in this the company acquiesced with perfect readiness.

**Circular Saws.**—It is said that in Europe circular saws are made considerably thinner than in the United States, and more skill is requisite both in the manufacture and use of the former than in the latter. The straightening, the regulation of the degree of tension, the balancing and the hanging, all involve most careful manipulation; in the use, too, the speed must be kept more regular, heating must be more carefully avoided and the set and trueness of the teeth more rigidly maintained. The fact to be considered, in respect to the thinness of the saw used in Europe as distinguished from the American, is that in the former country the scarcity of timber is an objection to the greater waste attending the use of thick saws; the latter, however, in this country, give a maximum duty with a minimum of cost.

The Turkish custom-house authorities at Constantinople and Smyrna have made a change in the duty on iron, and all pieces above 3½ inches wide are now charged sheet iron duty, making a difference of 75 per cent.

## Farm Laborers' Wages.

In 1836 the average of farm laborers' wages, with board, was estimated at \$9 per month. In 1866 they were put by the National Department of Agriculture at \$15.50 per month, with board. In 1866 the white-labor States paid an average of \$28, with board, and the average of the whole country was \$26. In 1869 the average had declined to \$25.13, and, with occasional variations, the decline continued until 1879, when the average was the lowest since the war. The changes to and since that year were as follows:

	1882.	1879.	1875.	1866.
Eastern States.....	\$25.61	\$20.21	\$28.06	\$13.30
Middle States.....	22.24	19.69	26.02	30.07
Southern States.....	15.30	13.31	16.22	16.00
Western States.....	23.63	20.38	23.60	28.91
California.....	38.25	41.00	44.50	35.75

Since the war the decline in the Eastern States is 20 per cent.; in the Middle States, 26 per cent.; in the Southern States, 104 per cent.; and in the Western States, 17 per cent. In California there has been a rise of .07 per cent. Where manufactures predominate, farm wages are high. Southern wages stand at about the same figure as when cotton was 100 per cent. higher than it is now. Since 1879 the greatest rise has been in New England. The highest wages paid in the United States are \$38.25 in California, \$36.50 in Colorado, \$33.50 in Oregon. The lowest rates are \$12.10 in South Carolina, \$12.86 in North Carolina and Georgia, \$13.15 in Alabama, \$13.06 in Virginia and \$13.75 in Tennessee. Kentucky pays an average of \$18.20, while on one side Tennessee, Virginia and Mississippi pay \$13.75, \$13.96 and \$15.10, and on the other side Illinois, Indiana and Ohio pay \$23.91, \$23.14 and \$24.55. The differences result in great part from negro labor. The differences between rates with and without board range from \$5 to \$9 per month. The effect of manufacturing industry upon farm labor is illustrated by the difference between the several divisions of certain States. The average rate in Northern Illinois is \$27.52, and in the Southern division \$19.87. In the northern district of Ohio it is \$25.96, and in the eastern division, \$22.65. The wages of harvest hands range between \$1.08 and \$2.65 per day, without board, and 78 cents to \$2.19 per day with board. The highest average is in the Northwest, and the lowest in the South.

**Steam Feeds in Saw Mills.**—The Minneapolis Lumberman and Manufacturer says the frequent destruction of steam saw mills by fire, since the introduction of the "steam feed," seems to support the theory that sawdust, coming in contact with the naked pipe, is the cause of the mischief. "We hold it to be a good rule," says the editor, "that all steam pipes should be covered, both in the interest of economy and safety, especially those holding live steam. The addition of any steam machinery or pipes to a mill necessarily increases risk, but we are not aware that there is anything in the construction of the steam feed which renders it especially dangerous, but its necessary position in the mill brings the long cylinder in close contact with the wood, and distributes heat half the length of the saw floor. At the same time, a great deal of the chips, sawdust, and the still more dangerous impalpable powdered wood dust thrown by the saws on to the hot cylinder must increase danger. We are not inclined to condemn this almost indispensable part of a modern saw mill as dangerous, but whatever risk may be involved in its use should be generally discussed and understood."

England imports some 10,000 tons of cork per annum, and the quantity is yearly increasing, notwithstanding the introduction of many stoppers and substitutes for corks, such as plugs of wood whose fibers have been specially softened for the purpose, india rubber and other materials. The French Government are giving special encouragement to the plantation of the cork oak in Algeria, and the same thing, no doubt, will be done in Tunisia. It is said that the tree will grow equally well in India, Central America, the West Indies, many parts of Africa and Australia, and in the South Sea Islands, and the foundation of a profitable industry might be established by introducing these trees and starting their systematic cultivation.

According to reports from Norway, a most remarkable find has just been made on the coast of Drontheim, consisting of what is supposed to be a door from one of the carriages forming part of the unfortunate train which fell from the Tay bridge two years ago. It is described as being half covered with blue satin and padded with horsehair, and in the upper part is a frame to slide up and down, in which some bits of glass may still be seen; it is provided with brass handles and lock, and bears on the inside the number 414. The door has been sold by public auction as wreckage, but is still in the possession of the purchasers, who think that it probably may be desired by somebody in England.

The first experiments to convert South Staffordshire (England) common pig iron into steel are said to have been successfully accomplished a short time since, and the steel produced is stated to be of good quality. According to English reports competent authorities assert that the steel is equal to the best Yorkshire iron for ductility, tenacity, fusibility and welding. It will be very suitable for boiler plates, tees and angles. The cost will be about one-half that of iron, and with the quality and cheapness of the raw materials at hand, South Staffordshire is looked upon as likely again to take the lead in the iron and steel trades of Great Britain.

It is announced in St. Petersburg that the extra 10 per cent. added to the Russian tariff in 1880 will be abolished after July.

The Mexican Government has abolished the tax on bullion and reduced the import duty on machinery.



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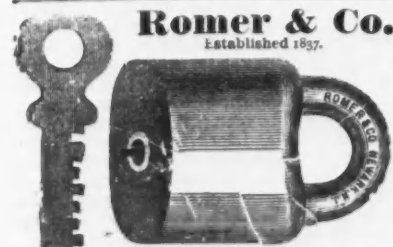
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In its use there is no wearing of nuts.

No greasy fingers. No nuts dropping

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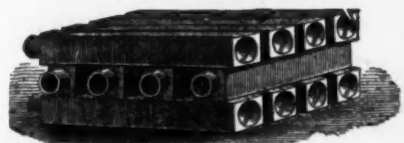
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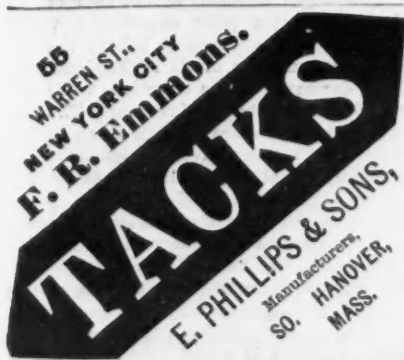
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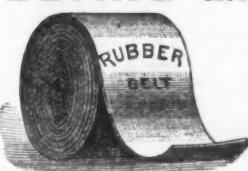
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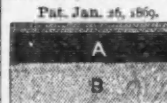


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This Packing is made in lengths of about 20 feet, and of all sizes from 1/4 to 2 inches square.

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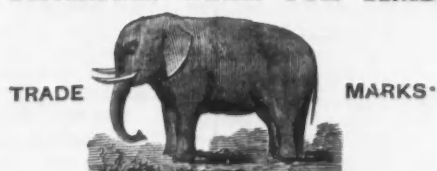
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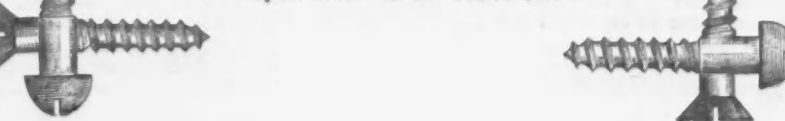
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**Key Seat and Slot Cutter.**

The machine illustrated in the accompanying engraving is made by Mr. W. P. Davis, North Bloomfield, N. Y. It is very strong in its parts and has a capacity of from 1/4 inch to 1 inch slots. It is said to be able to cut double the amount that can be performed on a planer or shaper, and ten times what can be done by hand. The saws employed in this tool are made for each width of slot required. Accordingly, there is no variation in the width of slots or keyways, and they are produced so perfectly that it is not necessary to have a skilled mechanic to run them. The machine is provided with improved saw clamp chuck blocks, and has an extension table. Throughout it has been arranged with great care with reference to strength, durability and ease of adjustment. This device supplies a want felt in many shops, as manufacturers can hardly spare a planer for work that a machine costing one-tenth the amount will do better and cheaper.

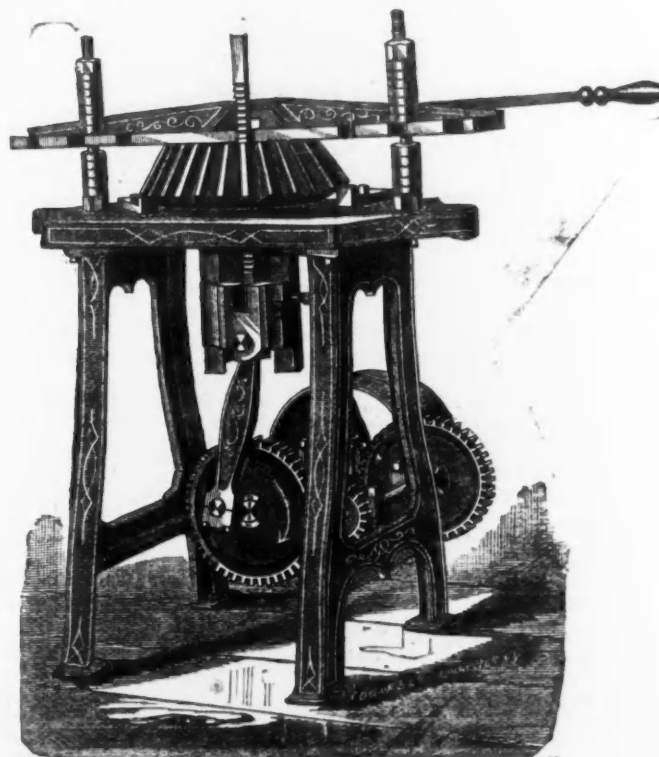
**The Pennsylvania Steel Company.**

The following brief description of the Pennsylvania Steel Company's works, at Harrisburgh, Pa., embodies matter of some interest, illustrating the extent and growth of the establishment within past years. The plant, as it now stands, comprises five Bessemer converters, two 7-ton and 3 8-ton; two 15-ton open-hearth furnaces in operation, and two 30-ton open-hearth furnaces in course of construction, one blooming mill,

20-inch roll train, and, when completed, will form a valuable addition to the already extensive works.

**Stevens Institute of Technology.**

The annual catalogue of the Stevens Institute of Technology, of Hoboken, N. J., has come to hand, and we take pleasure in briefly noticing the course of studies pursued in this institution, and of which a detailed description is given. The Institute, as will be seen from its secondary title, is essentially a school of mechanical engineering, and confers upon its regular graduates the degree of mechanical engineer, provided, of course, that evidence of proficiency has been given in the final examinations, and upon the presentation of these. At the close of the second year the student is prepared to enter upon the studies of the department of mechanical engineering, which occupy the principal portion of his time during the remainder of his course. Lectures are delivered upon the nature of materials used in constructing, locating and operating machinery, and the methods of obtaining them and preparing them for use, so far as such instruction is not included in the course of technical chemistry. The mathematical principles and the theory of the strength of materials are taught in the department of mathematics, and the course is continued by studying the theory of machinery, with detailed instructions in the use of tools and in designing machinery and millwork. Lectures are also delivered on prime movers, accompanied by exercises



Key Seat and Slot Cutter, Built by W. P. Davis, North Bloomfield, N. Y.

one rail mill, seven steam hammers, two blast furnaces in operation, two blast furnaces in course of construction, a foundry, pattern, machine, blacksmith and frog shop, and a merchant mill in course of construction. Bessemer plant No. 1 was built in 1865, with two 7-ton converters, two spiegel cupolas, 3 feet diameter; and three iron cupolas, 6 feet diameter, and has a capacity of 500 tons in 24 hours. The blowing engine is a horizontally condensing engine, with two steam cylinders, 40 x 60, and two blowing cylinders, 64 x 60; pressure of blast from 20 to 25 pounds. Bessemer plant No. 2 was erected last year, and has three 8-ton converters, served by two hydraulic ladle cranes and six hydraulic cranes for setting and drawing molds, handling bottoms, &c., the pressure being 300 pounds per square inch. A compound horizontal engine, with high-pressure cylinder 25 x 70, and low-pressure cylinder 50 x 70, and with separate air-pump condensers, supplies the blast, the pressure of which varies from 25 to 30 pounds. The plant has been in operation only a short time, and nothing definite can be said concerning its capacity. All the castings, boilers, roofs, wrought iron work and engines were made and erected by the Pennsylvania Steel Company. The blooming train is three-high, rolls 34 inches in diameter, driven by a vertical condensing engine, 44 x 54-inch cylinder. Though the capacity of this mill has never been determined, it is estimated that 600 tons may be easily turned out in 24 hours. The blooms are cut under a 4-ton steam hammer, and are transported to the rail mill on buggies. The rolls of the three-high rail train are 23 inches in diameter, and are driven by a 40 x 60 engine, with Bulkley condenser attached. The train is said to have rolled 1916 rails in 24 hours. The open-hearth plant was built in 1875, and consisted of two 6-ton furnaces, which were subsequently enlarged to 15-ton capacity. Heavy shafts, cross heads and piston rods are forged under a 14-ton steam hammer, which, when not in use for heavy work, hammers special steel into slabs and billets. The foundry, 60 x 230 feet, has two cupolas, each 5 feet in diameter, two core ovens and five 15-ton steam cranes. All ingot molds are made here, and all castings for repairs and new work. The capacity of the foundry is 40 tons of finished castings a day. The frog shop has a capacity of from \$30,000 to \$40,000 per month in railroad frogs and switches, crossings and interlocking apparatus. The blacksmith shop contains two 1000-pound steam hammers and 14 fires. Steam boilers, draft stacks and iron roofs are built in the boiler shop. A new frog shop, with additional facilities, is now in course of construction. There are four blast furnaces, using anthracite and coke, the ores being native Pennsylvania, Virginia, New Jersey, Spanish and African. A merchant mill is now being constructed, which will contain one 12-inch roll train and one

in planning and estimating the cost of machinery, mills and manufactories. While studying heat engines, the steam engine is made a subject of special and extended investigation in its principles, and in the details of design, construction and management, according to the best and most recent practice.

During the last three years the course of workshop instruction has been greatly extended, and, as a result, an urgent need for larger accommodations was felt. This need was supplied by a new workshop, stocked with numerous machine and other tools, besides a 20-horse-power engine. The foundry, in the basement of the building, is provided with a 17-inch cupola furnace, a 12-inch brass furnace, molders' benches, tools, patterns, &c. Forging, steam fitting and millwrighting exercises are designed to qualify the student to cope successfully with practical work, and a course of experimental mechanics is, moreover, given to the senior class at the beginning of the year. Considerable time is devoted to the study of physics, drawing and chemistry, and a regularly organized inspection tour is undertaken with each class. A preparatory department, known as the Stevens High School, is in connection with the college, and its candidates are prepared for admission to the latter. The number of students in attendance at the end of the last college year was 132; preparatory department, 61.

In districts where water is largely impregnated with lime, iron tubes will not answer for locomotives. Lime is quickly deposited on the tubes, and it adheres much more strongly than it would on brass tubes using the same water. In brass tubes a thin scale of 1-16th to 1/8 inch thick would be formed, while the incrustation about the iron tubes would, in a few years, completely block up the water space between the tubes. When this takes place it is impossible to keep the tubes at the fire-box end tight. To prevent the sediment from adhering to the iron, paraffine oil is recommended, even where brass tubes are used. About three pints for every 1000 miles run, put into the boiler the evening before washing out on the following day, is mentioned as the quantity. Being free from acid, this oil is safe to use.

The first works for manufacturing paper from esparto on the Continent are being erected at Barnburg, Germany, by a company of French and Hamburg capitalists. The works, it is said, will be ready next September.

It is said that an English inventor, in order to keep the cylinder walls of a steam engine hot, proposes to carry live steam in a hollow piston, or between two pistons in contact with the cylinder walls, and to provide means for draining off the water of condensation.



# The Iron Age

AND  
Metallurgical Review.

New York, Thursday, June 29, 1882.

DAVID WILLIAMS - Publisher and Proprietor.  
JAMES C. BAYLES - Editor.  
JOHN S. KING - Business Manager.

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THE UNITED STATES, BRITISH AMERICA AND SANDWICH ISLANDS.  
Weekly Edition ..... \$4.50 a year.  
Issued every THURSDAY morning.  
Semi-Monthly Edition ..... \$2.30 a year.  
Issued the First and Third THURSDAY of every month.  
Monthly Edition ..... \$1.15 a year.  
Issued the First of every month.

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REMITTANCES  
should be made by draft, payable to the order of David Williams, on any banking house in the United States or Europe; or, when a draft cannot be obtained, in postage stamps of any country.

NEWSDEALERS OR BOOKSELLERS  
in any part of the world may obtain *The Iron Age* through the American News Company, New York, U. S. A.; the Wilmer & Rogers News Company, New York, U. S. A.; and London, England; or the San Francisco News Co., San Francisco, California, U. S. A.

RATES OF ADVERTISING.  
One square (12 lines, one inch), one insertion, \$2.50; one month, \$7.50; three months, \$15.00; six months, \$25.00; one year, \$40.00; payable in advance.

BRITISH AGENCY.  
Office of THE IRONMONGER, 44a Cannon st., London.

DAVID WILLIAMS, Publisher,  
83 Beale Street, New York.

PITTSBURGH ..... 77 Fourth Avenue.  
J. D. WELLS, Manager and Associate Editor.

PHILADELPHIA ..... 22 South Fourth Street.  
THOMAS HOBBS, Manager.

CHICAGO ..... 36 & 38 Clark st., cor. Lake.  
HENRY SMITH, Manager.

CINCINNATI ..... Builders' Exchange.  
T. T. MOORE, Manager.

CHATTANOOGA ..... Eighth and Market Streets.  
R. B. LOWE, Manager.

SOLE AMERICAN AGENCY FOR  
THE IRONMONGER,  
Published at 44a Cannon St., London.

The oldest and leading representative of the British Iron and Hardware Trades.  
Subscription, postpaid, ..... \$5.00  
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## The Labor Situation West.

There is but little change to record in the labor situation in the iron mills West. C. Westlake & Co., of Warren, Ohio, have signed the scale, and work has been resumed at their mill. This is the only mill that, so far, has signed the scale since the first. The rumor referred to in our last issue, to the effect that the Milwaukee Mill had signed the scale, turns out to be false. One or two other mills have resumed under the Cincinnati agreement. Late last week the Amalgamated heart was fired by the publication of a telegram from Scottsdale, Pa., which for several years has been run non-union, that the mill was on a strike for the scale. This joy lasted only for a single night, and in the morning it was learned that the Amalgamated had been "sold" by some men who had been discharged for bad work. The mill has been running right along, and there was no foundation for the story.

The situation can be summed up as follows: All Pittsburgh and vicinity, the valleys, Cleveland, Wheeling, Chicago and St. Louis are virtually idle. Cincinnati and the mills that were concerned in the strike of last year are running. Some few mills are running in the districts that are idle, but so few that it does not affect the general statement. In the Pittsburgh district, for example, Carnegie Brothers & Co. are running, having signed the scale. Apollo, Superior, Ward's, Wellsville and Dilworth, Porter & Co., without signing. At St. Louis, the Stamping Co. and St. Louis Bolt and Iron Co. are running under the Cincinnati agreement. McDonald is working full non-union, and Helmbacher is working two hammers non-union. While there are these and other exceptions, it does not affect the statement that all the sections of the West, except Cincinnati, are idle. The Cleveland rolling mill is completely successful in its attempt to run non-union. This mill determined to fight it out, and they are succeeding. On Monday the entire works were run very full handed single turn, and the soft steel department double turn, and plenty of capable workmen were to be had. The workmen who desire to return to work are losing their fear, and even police protection is not now needed. Mr. Jarrett sought an interview with Mr. Chisholm, which was refused, the latter being determined that in no way will he recognize the Amalgamated Association. While there are denials as thick as blackberries that there is any dissatisfaction in the ranks of the Amalgamated Association, the evidences of such dissatisfaction are too plentiful to be concealed.

## The Brooklyn Bridge.

A crisis is evidently approaching in the affairs of this rather remarkable structure. A special meeting of the trustees was held last Monday, to hear the report of a committee appointed some time ago for the purpose of inquiring into the causes of delay in the delivery of steel by the Edgemoor Iron Company, and to suggest some means by which the work might be made to progress more rapidly. This committee consisted of Mr. Henry C. Murphy, President of the Board of Trustees, and the Mayors and Comptrollers of New York and Brooklyn.

The report of the committee was read by Mayor Low, of Brooklyn, and after reciting the amounts of monthly deliveries thus far, explained that the work of construction had been kept at a standstill because the bridge had not been furnished with the particular parts and shapes of the trusses which would admit of continuous work. The parts most needed were the eye-bars. It was claimed by the Edgemoor Company that it had taken four months of constant and costly experimenting to find out how to manufacture these bars. These difficulties were now overcome, and a letter was read from Colonel Sellers pledging the Edgemoor Iron Company to complete all its steel deliveries by October 31st, and at the same time explaining that on the signing of the second contract for the additional 1200 tons of steel in December, 1881, the engineering details were still so unsettled as to make the ordering of the blooms from the Cambria Works impossible till well on in January, and some of these blooms could not be delivered until July. The letter further claimed that the steel deliveries had kept pace with the furnishing of the detail drawings by the engineers, and concluded with the reiteration of the promise that all the steel should be furnished by October 31.

It had been expected that Chief Engineer Roebling, who has neither attended a board meeting nor been near the bridge during the last seven years, would be present, by request, at this meeting. Instead of this the gentleman sent a telegram to President Murphy, dated from Newport, saying that he could not be present. Mr. Roebling assigned no reason for refusing to meet the trustees at their request, which elicited expressions of great disappointment from several of the trustees. Mayor Low said with much warmth: "We have a contractor whom we cannot believe, and an engineer who 'refuses in a most cavalier manner to meet us; as one of the managers of a great public trust, I am tired of such child's play.' General Slocum's motion to request the engineer to be present at the July meeting, two weeks hence, was then carried.

And so this is the whole outcome of the great convulsion in the board over the failure of the Edgemoor Iron Company

to abide by the terms of its contract. *Parturient montes: nascitur ridiculus mus.*

A short review of the history of this now famous contract is here in order. In April, 1879, the Board of Trustees, having previously decided to substitute steel for iron in the suspended superstructure, advertised for bids therefor "in accordance with the plans and specifications prepared by the chief engineer." An examination of those specifications showed that no other change whatever had been made than the substitution of the word "steel" for "iron" in the old specifications calling for an iron superstructure, all shapes, sizes &c., being retained in steel. Nevertheless, the engineers claimed to have lightened the superstructure by about 600 tons, and increased its strength at the same time. When it was pointed out in the board that this claim of a saving in weight was utterly unfounded, and that, on the contrary, under these specifications, the weight of steel needed would be greater than that of the iron called for at first, the engineers said a mistake had been made, but that it would be rectified. This was never done, and the contract for the superstructure in steel was ultimately awarded to the Edgemoor Iron Company, in July, 1879, on their bid to deliver the completed steel work at the foot of the bridge towers for 4.69 cents per pound. A contract for such difficult work, taken on a rapidly rising market, at such a ridiculously low figure, excited general comment among steel manufacturers and bridge builders, and no little suspicion on the part of those who knew of the previous infamous transactions of the bridge ring. No sooner was the award made than it became evident that things were not in all respects as they seemed. First, the time for delivery, which before the award called for the delivery of the whole 5500 tons in nine months, was changed so that only 500 tons needed to be delivered in 1879, and the time for the delivery of the balance was left an open question. Next, the clause in the contract, which put the cost of testing upon the contractors, was left out, and the board agreed to pay Mr. Sellers for the testing. Next, he was relieved from furnishing any steel at all in 1879, by the engineers not furnishing him any detail drawings until February, 1880. Next, although the specifications stated distinctly that all changes in plans and details should be paid for at the regular contract price, the engineer was empowered "to make extra allowances not to exceed \$5000 at one time, 'without previously obtaining the consent of the board.'"

With all these advantages the Edgemoor Iron Company delivered, in the first 15 months, exactly 14 tons of steel out of 5500 tons promised. By this time it was pretty generally understood that something was wrong, and speculation was rife as to what would be the next move. It came in the summer of 1881, when the engineers suddenly discovered that instead of requiring 600 tons less steel than iron, they needed actually 1200 tons more, which additional contract was also awarded to Mr. Sellers. But this time, instead of 4.69 cents, the contract price was 10.5 cents per pound, and the forfeiture clause of \$100,000 was stricken from the original contract.

The advent of Mayor Low in Brooklyn politics, the decided stand he took on the outset against every kind of jobbery, the additional demand for another million and a half "to complete the bridge," Mr. Roosevelt's resignation because of his dissatisfaction with the management of the bridge affairs—all contributed toward precipitating the present inquiry into the steel contract. But the tactics of the ring have thus far been successful in warding off exposure. The committee appointed to look into the matter, whose report we have outlined above, held its meeting with Colonel Sellers with closed doors. The propriety of having the conference in secret is questionable, since the cost of the bridge is public enough. It would seem a reasonable proposition that the people who pay for the work have a right to know all about it. The fact is that the ring, accustomed to walk in the dark, were afraid either to tell the truth themselves or have Mr. Sellers tell it. It was only by mere inadvertence that the fact leaked out "that the engineering details were yet so unsettled" in December, 1881, on a contract awarded in April, 1879—30 months previous—and that the progress of the steel deliveries kept pace with the work of the engineers. Now, an engineer corps to which the cities have thus far paid over half a million of dollars in salaries alone, ought certainly be able to do in 30 months what the engineer corps of any bridge works in the country would have done in 3 months at the farthest.

The farce of throwing mud at Mr. Sellers, acted by the men who have purposely delayed the work till their rapid transit schemes for Brooklyn were ripe, is simply intended to blind the respectable and uninitiated members in the board and the general public. So also is the farce of their assuring Mayor Low and Comptroller Campbell, of New York, that Mr. Roebling would attend the board meeting, and that he is directing the work from his house, by watching its progress through a telescope from his window. Mr. Roebling is, unfortunately—and it is with sadness and deep sympathy that we say it—no longer able to attend to professional duties. The once brilliant mind is hopelessly wrecked, and his whole system has yielded to the ravages of an incurable disease. The ghouls who have

shielded their nefarious transactions behind his honored name will yet be called to account; but why Colonel Sellers, if he is not willing to be considered a side partner in the concern, should quietly submit to their abuse and the aspersions upon his commercial integrity, is something we fail to understand.

## The Market for Finished Iron.

It will be remembered that the chief point of difference at the conference between the iron manufacturers and the workmen was as to the ability of the former to pay any advance in wages at the present time, owing to the state of trade. The manufacturers stated that there was no trade, that prices were declining, stocks were accumulating, and that they would soon have to reduce production. The workmen denied this, claiming that it was a cry that was always heard about this time of the year, and that it was uttered for effect. They asserted that the reports in certain newspapers showed that prices were not declining, that consumption was up to production, and that the manufacturers could afford to pay the advance asked. Of course there was no doubt among manufacturers and those posted in what might be called the secrets of the iron trade, as to the correctness of the statement of the manufacturers, and this has now become apparent to all on-lookers; and even the hot-heads among the workmen, who insisted that the manufacturers' statement was not true, are becoming convinced that it was true. It is a strange fact that with all of the Pittsburgh, Mahoning and Shenango valleys, Wheeling, Chicago and St. Louis mills virtually idle, and with only the mills in the Cincinnati district running, the Cincinnati mills are complaining of bad trade, and it is a fact, also, that this statement is not made for effect. The Cincinnati mills are finding it difficult to secure orders to run their mills. So, also, immediately after the strike many Pittsburgh manufacturers who wished certain sizes of bar to sort up with, wrote East to endeavor to secure the iron. They were answered, almost without exception, that it would be impossible for the Eastern mills to fill orders before the middle of August or the first of September. Last week, however, the Eastern mills took a very different turn. One Pittsburgh iron manufacturer, for example, who two weeks before could not get quotations on the little iron that he wanted, received in one day offers from four different parties in the East of 100 tons of iron delivered in Pittsburgh at less than card rate at Pittsburgh. Another manufacturer who wished some pipe iron with which to sort up some sizes, failed at first to get quotations. In the second week of the strike he received a telegram offering him 100 tons of the size he wished at mill, delivered at less price than he had been selling the iron for before the strike. The same is true regarding English iron. As we have stated above, considerable of No. 20 sheet iron, which is largely used at Pittsburgh in connection with the manufacture of oil tanks, has been placed with English parties. The card rate at Pittsburgh on this iron is 4.1. The English iron, which is equal to the Pittsburgh iron, has been laid down in Pittsburgh at 3.5.

All these facts go to show not only that the manufacturers' statement was correct, but also that they were fully justified, in view of the condition of the market, in refusing to pay the advance demanded. Further, it shows that the present stoppage will be of very great importance and profit to the manufacturers. With this condition of things existing, it certainly is evident that if the manufacturers had continued running, iron must have gone down materially in price, and it probably is true that if the mills were to start to-morrow iron would be selling at two cents before many weeks had passed. No doubt a belief in this is what is making the manufacturers so united in their determination to resist the demands of the workmen, and no doubt also it has led consumers to refuse to place orders except for immediate delivery. Further, the present, while in some respects it is a good time for the workmen to strike—fuel, clothing and food not being needed to the extent that they are in the winter, and the opportunities for outside labor being much greater—it is also true that it is a good time for the manufacturers. The railroads are doing nothing. The other large consumers of iron, that is the manufacturers of agricultural implements, are at the present time doing very little. They are finishing up machines that are being manufactured, and have not yet begun the manufacture for next year, and, in view of the present state of the iron trade, they certainly will not place their orders at this time.

Arbitration has been suggested in a number of daily papers as a means for settling the present dispute in the iron mills in the West. Considerable astonishment has been expressed by some journals that it has not been resorted to, in view of the fact that the Secretary of the Western Iron Association is a writer on arbitration and its most prominent advocate in this country. The reason why arbitration has not been suggested, we presume, is that the Amalgamated Association, through its officers, have most positively in the past declined to entertain the idea of arbitration, and have scouted the principle in their department in the *Labor Tribune*. They have again and again written officially against arbitration, and declared that it has been a failure in England, and that the Amalgamated Association never would adopt it. We

## The Position of Tin.

Tin has been a puzzle to most people in the metal trade on this side for the past nine months. On May 1, 1881, Straits tin was worth £87. 10/ in the London market, against £82 the previous year, £68. 10/ in 1879, and £61 in 1878. On the first of May, this year, it commanded £97, after touching £114 in January. Production was 27,410 tons in 1872, 27,362 in 1873, and 31,840 in 1874. It has since steadily increased in consequence of the enormous output in Australia proper and Tasmania. Australia began with 150 tons in 1872. In 1873 the amount produced had risen to 2990 tons; in 1874 it was 5800; it then rapidly advanced to 9500 tons in 1878, receded to 8458 tons in 1879, recovered to 9149 in 1880, and finally attained the highest figure yet reached, last year, say 10,084 tons. The increase has been so rapid because the island of Tasmania or Van Diemen's Land, lying to the south of Australia and forming one of its colonies, has developed the industry of tin mining with great energy, and is becoming as important in it, almost, as the mainland.

The production of the world since 1878 has developed as follows:

	1881.	1880.	1879.	1878.
Tons.	Tons.	Tons.	Tons.	Tons.
England.....	8,620	8,007	9,500	10,106
Banco.....	4,385	3,638	4,253	3,900
Biliton.....	4,000	4,000	3,659	4,487
Straits.....	11,324	11,000	11,365	8,350
Australia.....	10,084	9,149	8,458	9,514
Bolivia.....	300	300	300	250
	38,713	36,994	37,539	35,597

Consumption last year is estimated to have been 32,000 tons in Europe and 9000 tons in this country. The total visible supply in Europe and America Jan. 1, 1882, was 18,736 tons, against 20,938 the previous year, and 23,500 on Jan. 1, 1880, whereas on May 1, 1882, it stood 16,213 tons, against 17,239 on May 1, 1881. The March deliveries this year in England and Holland were 1679 tons, the April deliveries 2053, against 1803 in 1881. Although the statistical position as given was certainly much better all along than at the corresponding time the previous two years, it hardly warranted so much higher a price, and indeed the extreme advance to £114 could not be sustained, especially after the panic at Paris, Jan. 19, had suggested caution, not only in financial circles, but quite as much among merchants and manufacturers in Europe. While, as we have shown, production has expanded of late years at an extraordinary rate, consumption kept pace with it as long as tin sold at a comparatively low price, allowing it to be used in many ways, from which a high cost like that now ruling will exclude it.

In Europe one of the greatest items of consumption is the manufacture of tin plates, and the strongest argument in favor of higher prices is the increase of Welsh tin plate export from 118,000 tons in 1872 to 242,400 tons in 1881. In connection with actual absorption of tin in England, it is curious to note how slight is the increase of tin imported and of English actually retained, when we compare the last five years with the preceding quinquennial period, as shown in the following table:

AMOUNT OF TIN RETAINED IN ENGLAND.					
	Im- ported. Tons.	Eng- lish. Tons.		Im- ported. Tons.	Eng- lish. Tons.
1872.....	6,624	3,866	1877.....	9,566	3,300
1873.....	10,275	4,914	1878.....	10,504	3,806
1874.....	9,846	4,211	1879.....	7,959	3,314
1875.....	12,120	4,392	1880.....	10,715	4,523
1876.....	9,672	3,593	1881.....	10,234	3,952
	40,267	18,186		48,845	19,055
Total.....	67,453		Total.....	67,900	

This slight increase, in the face of the doubling of tin plate exportation, would naturally incline people to believe that the actual consumption of tin in England may have decreased in one direction, while increasing in another, of late years. Thus far this year the dealings in tin in Europe have been chiefly speculative, consumers being evidently shy of the article at present high prices, while on this side there has been a dull, dragging state of affairs since January in the metal, consumption meanwhile going on at the same reduced rate as last year. Tin attracts less attention in this market this year than it has done for many years past. None but speculators for a rise seem to have any confidence in ruling rates, the less so now that we approach the dull summer months and the immediate future is dependent on so many contingencies, as, for example, the solution of the labor question and the eventual course of prices of articles of food, &c. While money remains as easy in Europe as it is at present, the speculative holders may maintain their position for some time longer, but production, stimulated by the extreme rates at which the metal is held, cannot but increase; there is, indeed, nothing that we can see to prevent it, so that sooner or later a more copious supply will make itself felt, unless in some shape or another the speculative element should succeed in inaugurating and keeping alive a "boom" on both sides of the Atlantic, based on a perhaps generally improved business outlook next fall, for which the elements may possibly not be lacking by that time; at least a good many seem to be of the opinion that such a revival is among the possibilities, if not of the probabilities.

It is worthy of note that two of the last built ocean steamers are surpassing all their



predecessors in point of speed. Their names are Stirling Castle and Alaska. Of both we have had occasion to speak heretofore. The Stirling Castle was built for the China tea trade, and arrived at London one week ago, from Hankow, with the first installment of the new crop, after a run of 29 days 22 hours, making the quickest trip on record. The distance is 11,250 miles. So she made an average of more than 375 miles a day, making no allowance for detention in the Suez Canal or at coaling ports. The Alaska crossed the Atlantic about the same time in 7 days and 26 minutes. These were not chance trips, favored by auspicious winds, but the achievements of skill and applied science in engine building and nautical construction.

#### The Stove Association.

The National Association of Stove Manufacturers, at its meeting in Niagara, held last week, adopted a new policy which we do not think will conduce to its usefulness. It made its meetings secret, to give greater latitude to the discussion of subjects which it was not considered desirable should be discussed publicly, and while it is doubtful if anything was said in "executive session" which was of sufficient importance to justify the secrecy with which the proceedings were surrounded, suspicions have been aroused and doubts created which are more likely to disturb the trade than to benefit it. For some years the National Association of Stove Manufacturers has been one of the safest and least objectionable of trade organizations. It has aimed to promote fraternal relations among manufacturers, to set clearly before workmen on the one hand, and dealers on the other, the facts of the business as they exist, and to recommend a basis for prices which, if not adhered to in all cases, at least tended to check reckless and unprofitable competition. This plan was abandoned in deference to the wishes of certain members who want to make it a controlling power in the trade, but unless we are greatly mistaken the change will have precisely the opposite effect. The moment it is attempted to make the association materially different from what it has been, forces will be set in motion which will disrupt it. Comparatively few of the questions affecting the stove trade can be profitably considered by a National Association. The conditions which demand regulation by associations and combinations among stove manufacturers are largely local questions. For example, the labor question has no interest for New England manufacturers in the shape in which it interests those of the Western States. In freights the interests of Eastern and Western houses are diametrically opposed; in prices the greatest harmony possible is that which can be secured by local associations in local markets. The National Association of Stove Manufacturers could not adopt and attempt to enforce a policy on any question without alienating some part of its strength; and an attempt to bind its members to any agreement would drive out all who see advantage in managing their own business in the way which seems best to them. In a word, the only possible reasons which the Stove Association can have for surrounding its proceedings with mystery, are those which involve more or less of danger to its usefulness and permanence. The stove trade is not a trade which can be controlled by a national organization. Combinations to fix or maintain prices can only exist as a pretense in this trade, and an effort to limit or curtail production for any reason would be utterly and unconditionally a failure. It looks to us as if the Stove Association had attempted more than it can accomplish, and that the sooner it returns to its original policy, the longer it is likely to live and be of use to the trade.

#### Prices of Puddling in England from 1851 to 1871.

The recent arbitration in England has brought out a statement of the prices paid for puddling in that country each quarter for the years between 1851 and 1871, which are as follows:

Years.	January quarter.		April quarter.		July quarter.		October quarter.	
	Bars.	Puddling.	Bars.	Puddling.	Bars.	Puddling.	Bars.	Puddling.
1851.....	£ 8 s. 6 d.	£ 8 s. 6 d.	£ 8 s. 6 d.	£ 8 s. 6 d.	£ 8 s. 6 d.	£ 8 s. 6 d.	£ 8 s. 6 d.	£ 8 s. 6 d.
1852.....	6 0 0	6 0 0	6 0 0	6 0 0	6 0 0	6 0 0	6 0 0	6 0 0
1853.....	10 0 0	10 0 0	10 0 0	10 0 0	10 0 0	10 0 0	10 0 0	10 0 0
1854.....	11 0 0	11 0 0	11 0 0	11 0 0	11 0 0	11 0 0	11 0 0	11 0 0
1855.....	9 0 0	9 0 0	9 0 0	9 0 0	9 0 0	9 0 0	9 0 0	9 0 0
1856.....	8 0 0	8 0 0	8 0 0	8 0 0	8 0 0	8 0 0	8 0 0	8 0 0
1857.....	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0
1858.....	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0
1859.....	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0
1860.....	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0
1861.....	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0
1862.....	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0
1863.....	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0
1864.....	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0
1865.....	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0
1866.....	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0
1867.....	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0
1868.....	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0
1869.....	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0
1870.....	8 0 0	8 0 0	8 0 0	8 0 0	8 0 0	8 0 0	8 0 0	8 0 0
1871.....	8 0 0	8 0 0	8 0 0	8 0 0	8 0 0	8 0 0	8 0 0	8 0 0

The object of this statement, as presented to the Arbitration Board, was to show on the part of the workmen that there was no rule of "shillings and pence" as the price of puddling. This statement was given by Mr. Baker, of the Chillingham Iron Company, of South Staffordshire, and shows the declared prices of iron and the prices of puddling for the period named. According to

the statement it will be seen that the average price of bars for the 20 years was £8. 2/ and the rate for puddling 8/7.

#### The Finishers and the Puddlers.

It has been rumored for some time in Pittsburgh that a meeting of the finishers, by which is meant the men working outside of the boiling and muck-rolling departments, was to be held in Pittsburgh on the 3d of July. This was denied most emphatically by those who were supposed to be in a position to know, but the *Labor Tribune*, in its Amalgamated column, has a call for such a meeting. This call includes the Pittsburgh and Wheeling districts and the Shenango and Mahoning valleys. It is asserted by some of the officers of the Amalgamated Association that this meeting has been in contemplation since before the strike, and will not have any bearing on the present difficulties. On the other hand, it is asserted that this meeting has been called by reason of very widespread dissatisfaction that exists in the association, arising out of the method of voting, and the number required to vote a strike, which is a bare majority. Mr. Reese, a well-known steel maker in Pittsburgh, is reported to have said concerning the meeting: "The object of that meeting is in general to provide some means for effecting a change in the present relations between puddlers and finishers, with the view to giving the latter a 'show for their white alley.' You know the puddlers outnumber the rollers and heaters, &c., ten to one, and on important questions a majority of one will carry the point at issue. This won't work any longer. We propose to divide the ranks, and make the puddlers and finishers a sort of double House of Parliament, just like the Common and Select Councils in this city. The puddlers will be the common branch, and we want a two-third majority rule; nothing less. As it is now, the finishers have no show at all in any important question."

Another ironworker is reported as having asserted that no split in the association ranks can occur during the strike, but there surely would be a breach some time in the future, owing to the district representation. Said he: "In the matter of strikes or trouble with manufacturers we are at the mercy of the puddlers. For instance, take a mill with 60 puddling furnaces, four men are allowed to each furnace, two puddlers and two helpers, making in all 240 men. They are allowed a district representation in the Amalgamated Association of 12, the helpers not counting. Now, in our case, say we have 10 sets of rolls, each employing, with the boss roller, 150 men. Now, we are only allowed a representation for the boss rollers, or for the 10 trains of rolls, one representative. They get 12 representatives for 240 men, while we only get one for 150 men. This is not just, and probably will result in some trouble hereafter, but it will have no relative bearing on this strike."

The permanency of a protective tariff in Canada having been a leading issue in the general elections to the Dominion's Parliament, held on the 19th inst., the commercial interests of the United States are more or less involved in the issue. The telegraphic advices indicate the success of the present ministry, though by a reduced majority. In Nova Scotia alone was there an unqualified defeat. While the questions of annexation, independence of British authority, the power to negotiate commercial treaties, &c., were not directly put before the people, the individuals arrayed on either side in the heated debates of the last few weeks were the foremost representatives of these leading ideas. When, therefore, Sir John Macdonald, the representative leader of the Dominion Parliament, finds that his political career is vindicated at the polls, no radical change in the present ministry need be expected, and Mr. Blake, of well-known free-trade proclivities, by the same expression, must try and become reconciled to the situation with the best possible grace. The Government is also sustained in its railroad policy, affecting the Canadian Pacific Railway extension and the grand projects for the development of Manitoba, including enormous land-grant syndicates and kindred measures. The strongest card played by the Macdonald administration was the recent favorable exhibit of the revenue returns, the handsome surplus arguing that there is "nothing like success."

Thus far, in connection with the strike of the ironworkers, there has been but very little suffering or deprivation on the part of those directly concerned in the strike. Most of them had enough saved to tide them over the two weeks during which they got no money from the Amalgamated, and, as the association began to pay out last Saturday, the improvident ones will have something with which to purchase the necessities of life. This, however, does not apply to the great numbers of unskilled workmen about the mills, the common laborers, who are not connected with the association. These are the men on whom the strike bears with crushing weight. Very few of them have any money saved, and have been dependent day by day on their wages. With no union of their own to rely upon, with no regular strike pay, they are in a deplorable condition, and are scouring Pittsburgh and the West for work. There can be but little sympathy for men who strike who have been making

from three to ten dollars a day, but for the poor fellows who have been making but a dollar and a half a day and now have no resources, there is certainly a great deal of sympathy. In this connection a telegram from Chicago is of interest. It is as follows: The "condition of the strikers at Irondale, who struck against wages ranging from \$1.50 to \$12 per day, is becoming pitiable. Their boasted reserve fund does not pan out, and many of them are actually suffering. They only grow more stubborn, however, preferring to depend on the town for support than to yield their point. The Hyde Park authorities have given notice that they will not, on any condition, give the strikers any aid, for which action the strikers hold the Calumet Iron and Steel Company responsible. It certainly is to be hoped, for the benefit of the families of these men, that the workmen of the West will see the futility of continuing the strike longer, in the present condition of affairs, and will accept the old price and go to work."

The Government at Pekin has filed a protest in the State Department at Washington against the Chinese exclusion bill. The popular sentiment of China expresses itself strongly in disapproval, the act being considered a ruthless disregard of treaty obligations. The reply of our Government through the Chinese legation is, in effect, that the desired amendments can hardly be acted on by Congress at the present session, but that the subject will receive the earliest attention possible. The restriction act, there is every reason to believe, is liable to prove detrimental in its effects upon our relations with the Asiatic powers, unless promptly modified in important particulars. By the same act our diplomatic mission to Pekin is seriously embarrassed, and even the advantages promised in the contemplated opening of Korea, under the auspices of an American naval commodore, are hazarded. It is also questionable whether the return of the Chinese students, lately at Hartford, will be practicable, which may well be regarded as a misfortune, if we consider the salutary influence which these young men were likely to exert hereafter upon the Christianization of the East and in the establishment of closer international relations.

Those who remember the phenomenally rapid development of the Pennsylvania oil region and the equally rapid development of the petroleum trade, will be astonished at the statement recently made by one of our most experienced statisticians, that the oil in the region is not only limited in quantity, but is practically reduced to such an extent that the time of its utter exhaustion is not far distant. The most elaborate and careful investigations show that the Pennsylvania oil region cannot be expected to afford the present output of oil for more than four years. The results which will follow even a partial suspension of the petroleum output are so wide-reaching that it is difficult even to imagine what they will be. Undoubtedly one of the first outcomes of a short American supply will be to stimulate enormously the development of the Russian oil fields. The next will be, in all probability, the establishment of numerous refineries in this country for the purpose of obtaining petroleum from coal directly. We need have no fears of an entire petroleum famine, even though the oil regions should at once cease to be productive. It will be remembered that common kerosene was made from coal long before the oil regions of Pennsylvania were developed to any extent, and in the coal itself we have an abundant source of supply when that from nature's great reservoirs is exhausted.

From time to time within the past few months we have heard rumors of a floating exhibition, which was being organized in England for the purpose of taking a number of commercial travelers and their goods around the world. The latest news about the project is that a steamer of some 3000 tons burden, by the name of the *Viceroy*, has been chartered, and is to be fitted out for the display of sample goods of all kinds. One deck is to be fitted out for exhibition purposes. The spaces for exhibitors contain about 42 cubic feet each, and it is proposed some time in June to start the vessel on the voyage around the world, visiting India, Australia, New Zealand and South Africa. The object is that manufacturers, patentees and others shall be able to bring samples of their specialties under notice at the chief colonial and foreign markets. It is expected that the voyage will last about a year. This is one of those ideas very like the little girl—when good, very good, and when bad, horrid. The chances are that the result to the manufacturers will not be good, though we dare say that the traveling men who take part in the trip will enjoy it very much indeed.

Our English friends, with their usual lack of knowledge of American matters, get things wonderfully mixed up in their statements regarding the strike now in progress in the iron works of the West. The *Iron and Coal Trades Review*, which is generally very well informed on these matters, has got the iron strike, the coal miners' strike and the strike of the ore handlers at Joliet all confounded, and ascribes the violence in connection with the employment of negroes in the coal mines, and of non-union men at Joliet, to the pud-

dlers and other operatives connected with rolling mills. It appears, however, from our English exchanges, that our strike has been more a subject of conversation and discussion with the English iron manufacturers than it has been a source of profit. The *Iron and Coal Trades Review* states: "Our prices have not been affected, and so far as we can see, the extra business we shall do with America on account of the strike will not be so much as to justify any advance. There is no reason to expect that the effect of the strike will be that we shall be called upon to extend our present production or to light a single furnace more." Probably not.

The pioneer of the new French steam line, to run triangularly from Havre to New York and thence to New Orleans, is now on her homeward voyage, with a full cargo and too steerage passengers. New Orleans editors cite this as among the first fruits of the French bounty system, which they commend to Congress for imitation, alleging that the condition of France and America in respect to their shipping, has been identical. Commerce increases, but England runs away with the shipping.

The latest advices from Chili and Peru indicate that the basis of pacification most likely to afford a solution of the present difficulty is the acquisition by the conqueror of the three provinces, Arica, Tacua and Tarapaca, which have been held by Chili as indemnity for the war. She is disposed to consider no other proposition, and doubtless has the approval of the English bondholders in adhering to this plan. It is expected that the scheme will be more fully presented in the message of the President of Chili to Congress, which was called together the 1st inst. To the merchants of this city who have been longest in the trade with Chili, Peru and Bolivia, and who care nothing for political questions, the ascendancy of Chili in the disputed territory is to be desired. Chili has always been most favorable to trade, and her control of Arica, which is the key to Bolivia on the Pacific, is looked upon as the best arrangement that could be expected as the matter stands.

The fourth, and probably the last for the present, of the Antipodean International Exhibitions has been formally opened in New Zealand, and many of the principal exhibitors at Sidney, Melbourne and Adelaide are said to make a goodly display of manufactures at Christchurch. One of the curiosities of the official programme, however, indicates a weakness somewhere. We read that "No gold medals will be given, but where a certificate of gold medal has been awarded, the exhibitor can obtain 'the same from the die sinker on payment of the value.' Aside from its simplicity, the only advantage of this arrangement is that an ordinary mathematical calculation will determine exactly what the medals awarded at Christchurch are worth."

Underground railway projects in New York City make slow progress at the beginning, whatever they may result in hereafter. Between rival corporations and the wrangling of stockholders they have little to show thus far, aside from plans and specifications and issues of scrip. In one instance, even the latter appears to be a source of trouble, the attorneys employed, who were paid for their services in scrip, having undertaken, as alleged, to run the tunnel business in their own interest. If the confidence of capitalists could be secured there would probably be little difficulty in making a hole in the ground, but without either one of these essential factors the future is uncertain.

It is probable that the promoters of the Channel Tunnel will be permitted to proceed with their work, notwithstanding the strong opposition in many quarters. It is stated that the report of the Channel Tunnel Committee, now in the hands of the Duke of Cambridge, affirms that, in the opinion of the majority of the members, the tunnel may be made without danger to England. There is at present some difference of opinion as to the methods of protection to be adopted and the location of the entrance of the tunnel, but the resumption of the work at no distant time may be regarded as almost certain.

At Leavenworth, Kan., in the United States District Court, Judge Foster gives a verdict for the full amount claimed, with interest, against the Western Union Telegraph Company, on account of an error in a dispatch forwarded by the defendants, the operator by whom the message was forwarded having made an order to buy wheat to read 50,000 bushels, instead of 15,000, as originally written. Judge F. decided: "If the dispatch was not obscure, and care on 'their part would have prevented the mistake, the defendant is liable.'"

With the view of testing the practical effect of the new tariff arrangements with France upon Sheffield cutlery sent to that country, an English firm recently made up a package containing patterns which formed four-fifths of the staple articles sent from Sheffield to France. Under the old treaty the duty upon the goods would have amounted to 15 per cent. on their value, but according

to the new tariff it is about 72½ per cent. England has made war for less causes than this.

An exploring party is about to leave San Francisco with a view to developing the mineral riches of Alaska. The prospectors will probably be absent about three years, and all possible precautions have been taken to insure a successful issue of the undertaking.

#### David Thomas.

The funeral services of the late David Thomas were as simple and plain as possible, in deference to his expressed wish and the desire of his family. The casket was placed in the large hallway of Mr. Thomas's late home, and from 1 until 3 o'clock, p. m., yesterday, hundreds of people passed to view the remains. The employees of the Thomas Iron Co., the Crane Iron Co., the Catsaqua Manufacturing Co., and the business men of Catsaqua, attended in bodies, all work being suspended at the iron works, and stores closed. Special trains were run from Philadelphia and towns in the Lehigh Valley, conveying prominent railroad and iron officials, who came to pay the last respects to their departed friend. The funeral services consisted of the singing of a hymn, the reading of selections of Scriptures from Psalms and Corinthians, by the pastor; a prayer by Rev. Dr. Cattell, of Lafayette College, Easton, and the rendering of a favorite hymn,

"My home is there."

The following old employees acted as carriers: Messrs. Edward Burns, James Clugston, James Nevins, John McClelland, William Love, David Williams, Wm. P. Hopkins and Philip Storm.

The following employees at the Crane Iron Works previous to 1850 attended the funeral in a body, and were assigned carriages in the procession: John Clark, Thomas Bear, Robt. Creelman, Wm. Hock, Jas. McCandless, Wm. Dougherty, John McIntyre, Simon McKee, Joseph Weisley, John Dougherty, Patrick Cunningham, Johnson Kelly, Henry Sellers, Capt. William Dougherty, Samuel Glace, Wilson Scott, Jesse Brown, William Cunningham, Martin Simons.

The following gentlemen were invited to act as pall bearers: Lloyd Chamberlain, treasurer L. V. R. Co., Philadelphia; B. G. Clark, New York; John Fritz, superintendent Bethlehem Steel Works; Robt. H. Sayre, superintendent L. V. R. Co.; Ario Pardee, Hazleton; W. L. Cunningham, Wilkesbarre; John T. Knight, treasurer Thomas Iron Co.; M. H. Horn; John Leisenring, Mauch Chunk; J. M. Swank, secretary American Iron and Steel Association; Jos. S. Harris, president Lehigh Coal and Navigation Co.; Fisher Hazard, Mauch Chunk; Samuel Sloan, president Delaware, Lackawanna and Western R. R. Co.; Ashbel Welch, Lambertville, N. J.; W. W. Stearns, general superintendent Central R. R. of New Jersey; Theo. F. Randolph, M. C. Morristown, N. J.; F. B. Gowen, president P. R. R. Co.; Hon. R. E. Wright; Lewis Taylor, president Taylor Iron Co., High Bridge, N. J.; J. E. Wooten, superintendent P. and R. R. Co.; Samuel McHose, Allentown; Theo. Mitchell, Philadelphia; Geo. B. Roberts, president P. R. R. Co.; Geo. Burnham, of Burnham, Parry, Williams & Co., Philadelphia; Geo. A. Hoyt, president Pennsylvania Coal Co.; S. Dickson, president Crane Iron Co.; Joseph J. Albright, Scranton; Chas. Parrish, president Lehigh and Wilkesbarre Coal Co.; Ezekiel M. Patterson, New Brunswick, N. J.; Prof. W. H. Chandler, Bethlehem; Harry A. Packer, vice-president L. V. R. Co.; Geo. A. Wood, Philadelphia; Thomas Dickson, president Delaware and Hudson Canal Co.

The funeral procession was the largest ever seen in Catsaqua; it was headed by the employees of the Catsaqua Manufacturing Co., 300 in number, followed by the Thomas Iron Co.'s employees, 300 men, and these again by the Crane Iron Co.'s men, 250 in number; the Catsaqua and Fogelsville Railroad employees, and others. Then came the clergy in carriages, representing almost every town in the Valley, followed by the distinguished pallbearers and old employees; then the corpse, followed by the relatives and intimate friends. The head of the procession reached the vault in Fairview Cemetery at 4.30 o'clock, while the rear was at Front and Bridge streets. The workmen, upon reaching the vault, opened order and allowed the procession to pass to the inclosure, wherein were deposited all that remained of one greatly beloved and respected by his fellowmen. The occasion brought many distinguished, learned and wealthy men from abroad.

The following resolution of respect was adopted yesterday by the Iron and Metal Exchange Co., Limited:

Resolved, That the directors be respectfully requested to enter in the records of the Company the following:

#### IN MEMORIAM.

David Thomas, who departed this life on the 20th day of June, 1882, may be called the father of the iron manufacture of the United States. He came to this country to make it his home at a time when the then known coal fields of the country were not believed to be capable of furnishing fuel adapted to the reduction of iron ores; and by his individual skill, perseverance and energy, demonstrated that the fuel from these same coal fields is exceedingly well adapted to the purpose. The benefits which this country has derived from his success in that direction are incalculable. It laid the foundation upon which has been built the great iron industries of the whole country. His well-spent life, in its exhibition of industry and wisely directed and unwavering determination to overcome obstacles, may well be taken as a model for the workingman, and in its gentleness of manner, kindness of disposition, warmth of affection, unswerving integrity, devotion to every good cause, and adherence to the loftiest Christian principles, may well be taken as a model for any man. The great success he attained as a manufacturer, which enabled him to enjoy a serene and ripe old age with the large results of his life-work spread out before him, was due in no



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## SQUARE PACKING,

WITH ELASTIC RUBBER BACK,

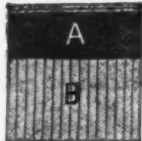
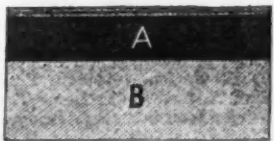
For Packing the Piston Rods & Valve Stems of Steam Engines & Pumps.

PATENTED JANUARY 26, 1869.

No. 86,296.

Side View.

End View.



B. Represents that part of the packing which, when in use, is in contact with the Piston Rod.  
A. The elastic back, which keeps the part B against the rod with sufficient pressure to be steam tight, and yet creates but little friction.  
The part "B" is made of successive thicknesses of cotton duck, firmly cemented together with an elastic lubricative compound. When in use, the edges of the cotton fabric are brought in contact with the Piston Rod, so that the wear is very slow, and hence the packing is very durable. Its convenience, durability and satisfactory working must commend it to the favor of Engineers wherever it is tried, and lead to its general use.

## WRIT OF INJUNCTION.

CIRCUIT COURT OF THE UNITED STATES.

SOUTHERN DISTRICT OF NEW YORK.

THE NEW YORK BELTING AND PACKING COMPANY  
vs.  
EBENEZER SMITH and MATTHEW GATES.

In Equity.

THE PRESIDENT OF THE UNITED STATES.

To the Defendants Ebenezer Smith and Matthew Gates and each of them, their clerks, attorneys, agents, servants, and workmen, GREETING:  
WHEREAS, It has been represented to us in our Circuit Court of the United States for the Second Circuit and Southern District of New York that Letters Patent of the United States were, on the 25th day of January, 1869, issued in due form of law, to the complainant as assignee of Donald C. Gately for "Improved Vulcanized Rubber Packing," said Letters Patent being known and distinguished as No. 86,296, and that you, the said defendants, have infringed the rights secured by the said Letters Patent by manufacturing, making, using and selling to others Vulcanized Rubber Packing substantially as described in the Letters Patent aforesaid, contrary to the form of statute in such case made and provided.  
Now, THEREFORE, we do strictly command and Enjoin you the said Ebenezer Smith and Matthew Gates and each of you, your clerks, attorneys, agents, servants, and workmen, under the pains and penalties which may fall upon you and each of you, in case of disobedience, that you forthwith desist from making, manufacturing, using or selling, in violation of said Letters Patent, any Vulcanized Rubber Packing involving or embracing or manufactured in pursuance of or containing the invention described and claimed in Letters Patent of the United States No. 86,296, viz.: the combination with the packing such as therein specified of an elastic backing or cushion of vulcanized India-rubber substantially as described and claimed in the said Letters Patent, until further order in this cause.

Witness the Honorable Morrison R. Waite, Chief Justice of the Supreme Court of the United States, at the City of New York, on the 2d day of June, A.D. 1882.

TURNER, LEE & McCLELLAN,  
Complainant's Solicitors.

JOSEPH M. DEUEL,  
Clerk.

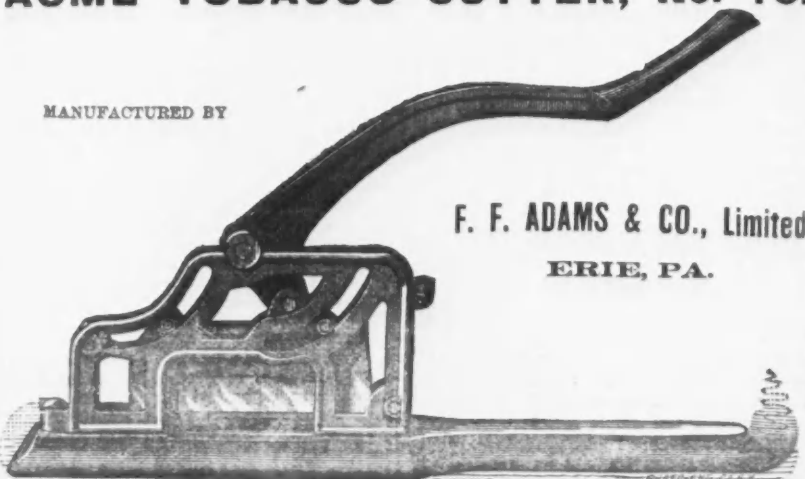
We have instructed our counsel to commence suit against all parties who may infringe this Patent.

**NEW YORK BELTING & PACKING CO.,**

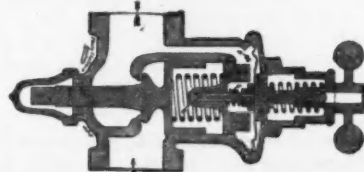
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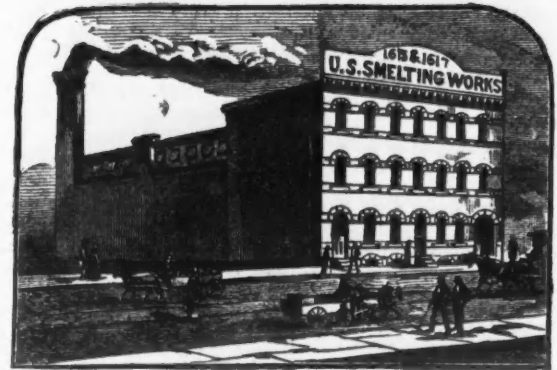
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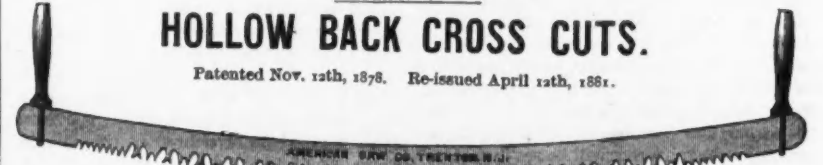
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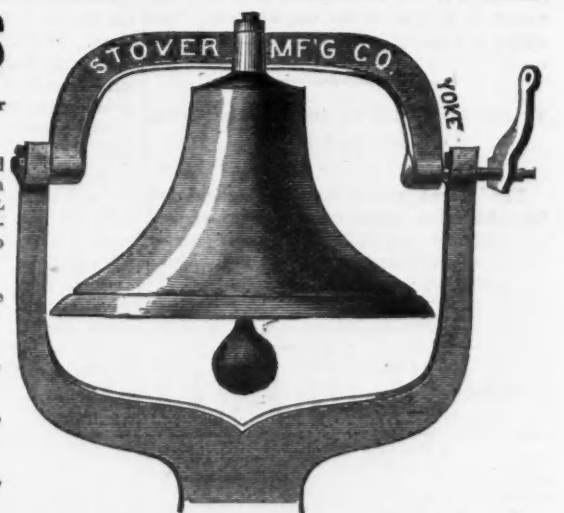
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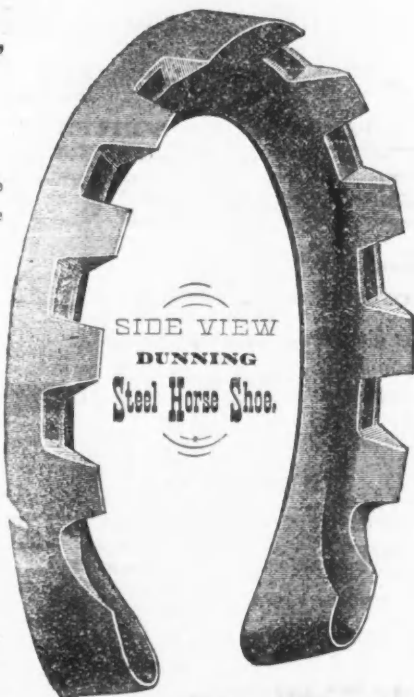
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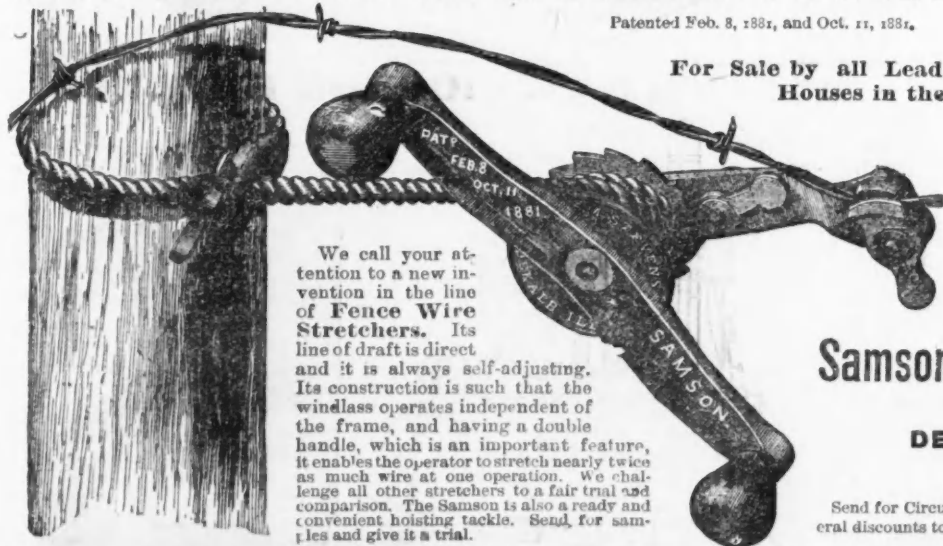
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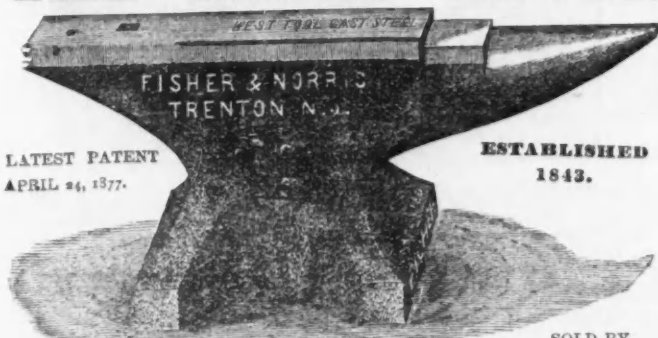
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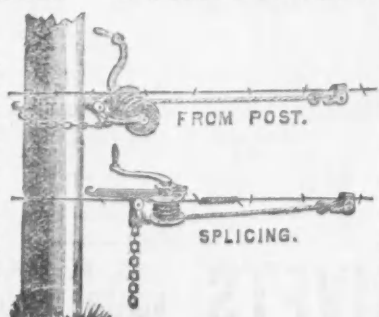
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sense to fortuitous circumstances, but altogether to the qualities of the man.

The members of the Iron and Metal Exchange, with a consciousness of the obligation they are under to David Thomas, desire to record their respect for his memory and their reverence for his name; and while they sympathize with the members of his family in the grief which comes with his loss, they congratulate them that they have the right to cherish in their memories the grand manhood which characterized their honored head.

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Committee.

### Iron and Metal Exchange.

The Iron and Metal Exchange held an adjourned meeting on Tuesday afternoon at the Bank Building, corner of Pearl street and Burling Slip, pursuant to adjournment. The special object was the election of president. Mr. Delafield occupied the chair, and read a letter to E. P. White from Mr. Geo. V. Tompkins, who had been tendered the nomination for the presidency, but declined, as appears from the following:

NEW YORK, June 22, 1882.

E. P. White, Esq.—DEAR SIR: After carefully considering the proposal that I should allow the use of my name as a candidate for the presidency of the Iron and Metal Exchange, I have come to the conclusion that I can be of more service to the exchange and to my firm as a private member, in which capacity I shall be glad to do business on the floor of the exchange, whenever it is possible and desirable. Thanking you, however, for your courtesy, and regretting that I am unable to accede to your request, I am, yours truly,

GEO. V. TOMPKINS.

At this stage of the proceedings, on motion, the Exchange proceeded to elect a president. Mr. E. P. White was nominated almost by acclamation, and one or two other names were mentioned.

Messrs. Mayer and Whitney were appointed tellers, and upon collecting the ballots it was found that the vote stood as follows: There were cast for E. P. White 23 votes, and for Wm. D. Marval two. Mr. White's election was thereupon made unanimous, which honor he accepted with acknowledgments of gratitude. He assured the members of the Exchange that he would always be found at the post of duty, and expressed confidence that the Exchange would honorably fulfill its mission. He also suggested, with reference to any other kindred organization, that all differences or discussion should be ignored.

On motion of Mr. Delafield, a resolution was unanimously adopted, directing the secretary to issue, on or before July 1st, a certificate to each member on a surrender of a receipt for the initiation fee and payment of the annual dues.

A paper for subscriptions to the banquet fund for the day of opening of the new rooms of the Iron and Metal Exchange was speedily filled up.

On motion, the meeting adjourned to July 11, the first business day of the Exchange.

"Commoner," whose letter in our issue of two weeks ago called out the interesting response from Mr. Thos. J. Pope which appeared in our last issue, returns to the discussion in the following pleasant letter, which shows an intimate knowledge of the facts involved, whatever may be thought of the conclusions drawn therefrom:

NEW YORK, June 23, 1882.

To the Editor of The Iron Age.—DEAR SIR: Mr. Pope's prompt reply, in your issue of the 22d, to my letter, has been a great satisfaction to those who have believed that the now celebrated committee of nine had accepted a trust and betrayed it. Instead it seems that they were magnanimous enough to run the risk of such an accusation, in their earnest desire to protect the self-helpless metal trade of New York against the vague but terrible "speculators," and that the severity of their remedy was only the outcome of their paternal anxiety for the good of the trade. He makes a few errors which I am sure he will be glad to have pointed out and corrected; errors that must have been caused by oversight in hasty writing, as Mr. Pope is generally understood to know more about the Genesis and subsequent management of the Lords than any one else.

It is true that 16 of the signers to the call for the meeting of February 15th are now either shareholders or "associates" of the House of Lords, but a mistake to assume that all 16 "approve the action of the committee." Seven of the 16 have expressed to the writer and others their very stern disapproval of that action (one of whom is represented in the Commons by two seats). Of the remaining nine, six were committeemen and one other chairman who selected the committee, and presumably indorsed their action. But this analysis is not all of the question at issue. Mr. Pope has omitted to state that all of these 20 signatures, except his own, were given at the request of two of the firms who, he admits, did not, and do not yet, "approve of the action of the committee," the original paper being still in the hands of one of these firms. They did all the work necessary in getting the meeting together, and have some right to claim that the committee owed its ultimate existence to them, inasmuch as the whole movement originated with them.

It is a mistake to say that any one was "fully prepared to 'rig' the meeting" (except, possibly, the clique who did take possession of it when they did get there). In order that some organization should be had, it was intended to call Mr. Geo. A. Evans to the chair, a gentleman who, even Mr. Pope will admit, was not likely to be a tool with which to accomplish all the desperate things Mr. Pope and his friends say they feared; but Mr. Evans suspected the design and, with characteristic modesty, did not come to the meeting until after the organization had been effected.

It is a mistake, again, to assert that seats in the House of Commons were "largely taken up in groups" by any one. Some seats were bought by outsiders, as is always the

case with a new exchange, who showed in this way their appreciation, as keen business men, of its value. The number is comparatively small one, and is daily being diminished by sales to metal men. The business is a perfectly legitimate and customary one, as will be known by any one not as lamentably ignorant of the nature of exchanges as most of the organizers of the House of Lords seem unfortunately to have been.

As regards speculation, the Commons recognize that it is inevitable in every business, and is frequently beneficial, and make no pretensions to a spurious morality concerning it. The Lords seem to have practically adopted the same view, for all of the open sales made recently in their rooms have been "futures," and most of them are said to have been "washes." This is apparently progress in the line that I admitted Mr. Pope's exchange was actively following—that of concessions, in order to compete with the Commons—an admission that Mr. Pope seems to have overlooked. I pointed out these several concessions, and among them the privilege of voting to be given to associate members and the increase of stock. At the beginning, the first incorporators said frankly that they would "enter no exchange which they did not absolutely control;" while their by-laws, published in *The Iron Age* of March 30, prescribe that all rules and regulations are to be prescribed by a Board of Directors, to be chosen by the stockholders. The stock has been increased by a small amount, but a controlling interest is still in the hands of the nine committeemen. (The president, for instance, holding 15 shares in the names of the different firms with which he is associated while more than half the associates are still only associates, and consequently without any legal rights to vote.)

Mr. Pope assures us that "every member stands on the same footing," and no doubt, in the innocence of his heart, believes what he says, but he will hardly find any good lawyer that will indorse his view of the situation. All the property and rights of the company necessarily belong to the shareholders, the associates being simply persons who have leased the privilege of doing business in its rooms. The stockholders may kindly concede certain privileges to the associates, but unless they are part of the contract with the latter, the stockholders cannot be compelled to do so. In like manner, any surplus above expenditure that may accumulate belongs absolutely to the stockholders, and although they may agree to limit their annual dividends to 6 per cent., nobody has any right to dictate to them what they shall do with their property in the shape of a surplus. They may devote it to "the encouragement of good fellowship in the trade," as their prospectus has it (presumably in the shape of periodical free lunches), or they may divide it among the lessees—the associates—from whose payments it would be derived, or among themselves, exactly as they pleased. All of this is an evil necessarily incident to their mistaken plan of organization as a stock company. Mr. Pope says that this plan was adopted in order to limit the liability of members. The Commons have attained the same end by the wording of sections 2 and 4 of their by-laws; but, if these very prudent gentlemen of the committee would not have been satisfied with this, what was there to prevent their getting a special charter? They had ample time and opportunity, for that of the Commons, introduced two months later, only failed of passage on account of the opposition of a Senator representing a county in which one of the Lords has important interests; a single objection, under the rules of the Senate, being sufficient to check the placing of a bill on the order of third reading ahead of its regular place, which would not have been needed earlier in the session. But one reason is intelligible for this stock company business—that the company might retain exclusive control, and such an interpretation we are justified in accepting. And in this connection, how does Mr. Pope claim that "exclusion of any one, except for badness of character or improper action in business, is impossible"? The by-laws provide that three blackballs shall exclude, which opens the door at once to personal spite on the part of a few men. No matter how many new stockholders are admitted, three men can still exclude from associate membership under the rules. This sop of an increase of stock was not thrown out "as soon as the committee had completed the organization of the Exchange," as Mr. Pope mistakenly asserts. The certificate of incorporation was issued on March 21, and the new stock subscriptions were opened on May 16, and closed the same day.

And now one word about the secrecy of the committee and I shall have done. Will Mr. Pope contend that the operations of the committee were fully known to the trade? If so, it is hard to understand how he is only mistaken, and I will be glad to have him explain why, when the company was organized on March 21st, the committee should instruct the chairman of the February meeting to write on March 15th that "the committee will be ready to report in about 10 days;" and again, on March 24, "the committee are not yet ready, but tell me that they hope to have their plans matured the last of next week;" that is, in 10 days more. The committee have never reported to the body which appointed them, and Mr. Pope's simple assertion is not a sufficient explanation of their "furtive secrecy."

Apologizing for this use of your space, I am, as earnestly as before, A COMMONER.

The *London Times*, in a leading article on the progress of America, says if there were no direct evidence of the reality and rapidity of material progress in the United States, it would be found in the singular absence of excitement in American politics. What is especially remarkable in the present development of American energy and success is its wide and equal distribution. The readjustment of Federal representation bears testimony to the political capacity of the people, and affords good ground for the hope that the future of the negro may be rescued from the mischievous interference of professional philanthropists and self-seeking demagogues.



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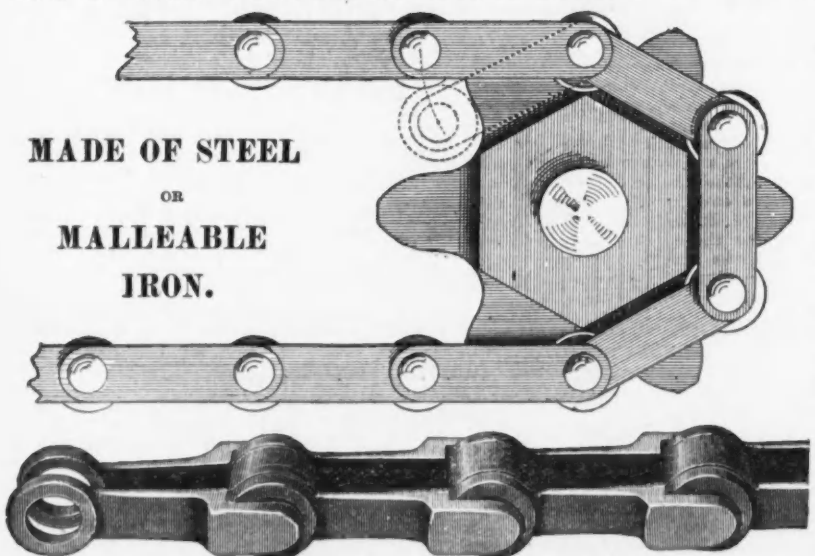
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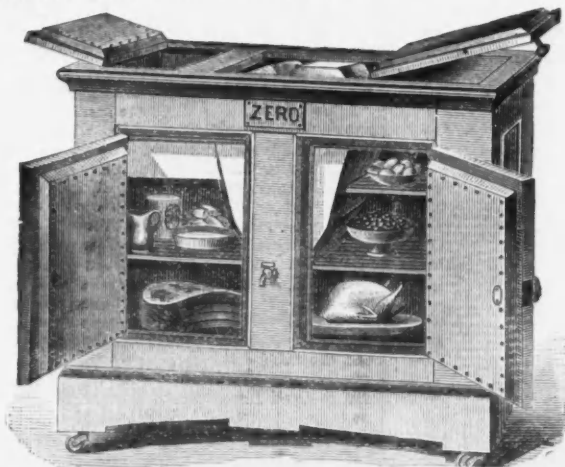
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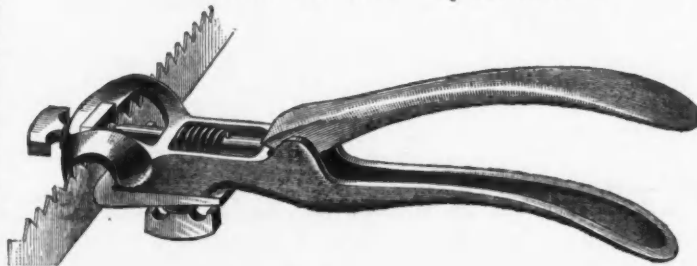
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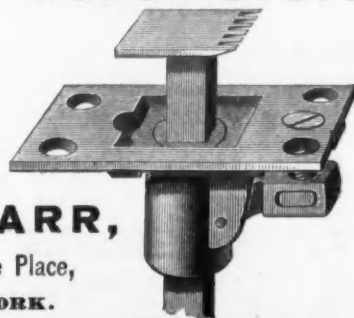
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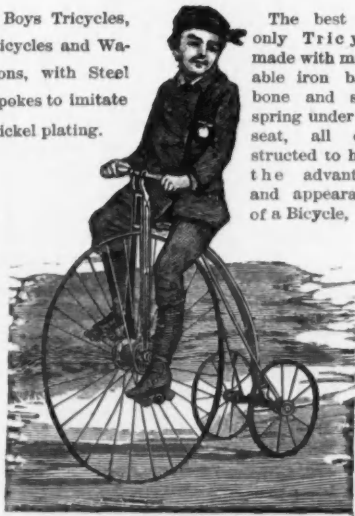


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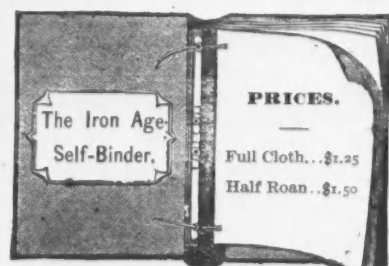
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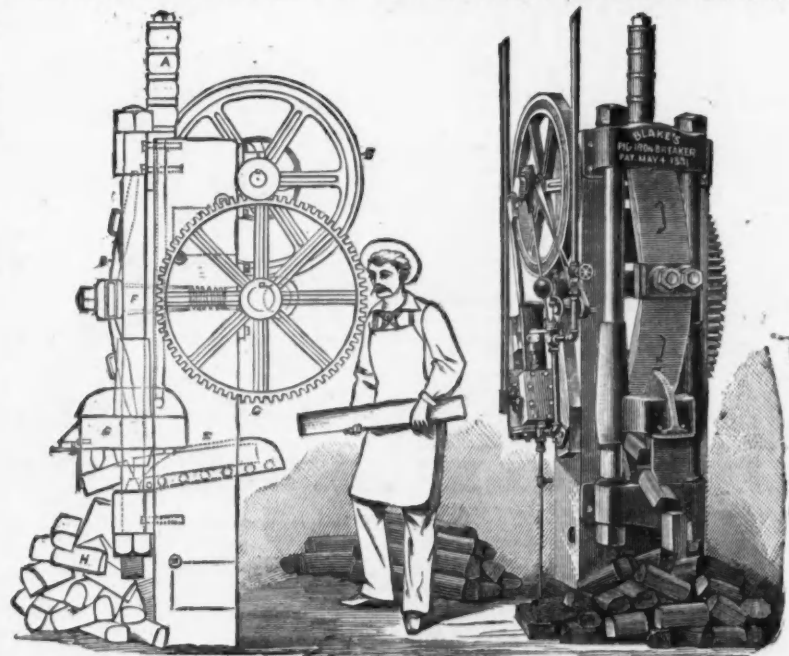
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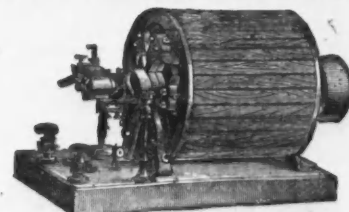
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**A. B. DEMING, Traveling Agent for Jobbing Trade.**

**WM. THOMSON & CO., Toronto, Sole Ag'ts for Canada.**

Letters Patent of the United States were issued to

Wm. B. Dean for improvements in Lemon Squeezers,

consisting among others in supplying them with legs

and with a removable juice cup held in a frame.

Now this is to notify all persons making, vending or

using Lemon Squeezers with the said improvements,

or either of them, that I will hold them responsible in

damages for infringement of the said Patent.

WM. B. DEAN, 43 Murray St., N. Y.



No. 2.



No. 3.

**RIVETS**

**C. F. HARRISON,**  
**BOILER, BRIDGE & TANK**  
**CUYAHOGA FALLS, OHIO.**

**RIVETS**



### Mechanical Exhibits at the Master Mechanics' Convention.

During the meeting of the Railway Master Mechanics' Association at Niagara, the back porch of the International Hotel was temporarily utilized for exhibition purposes, and there was quite an array of inventions, improvements and appliances which gave it somewhat the character of a mechanical fair.

Budd & Ellis, 10 Oliver street, Boston, showed an English wrought-iron car wheel with cast-steel tire, manufactured by the Patent Shaft and Axle Tree Co., Wednesday, England.

Mr. John N. Payne exhibited a nickel-plated model of a railway water column for filling the tanks of tenders.

The Elkins Mfg. and Gas Co., of Philadelphia, exhibited some bearings made from their Ajax metal, which is an alloy having Lake Superior copper for its basis. It is a very tough, homogeneous metal, showing a tensile strength of 29,600 pounds, and qualities which, it is claimed, peculiarly fit it for bearings. The loss in pouring is said to be not greater than 1 1/2 to 2 per cent., and the old metal is worth the price of the best red brass.

Port & Co., Cincinnati, exhibited a perfection revolving head-light for locomotives, with side signal numbers and Nicholson's patent signals.

Collins & Co., 212 Water street, New York, made a very striking display of railroad tools, wrenches, &c. The various tools were explained by their representative, Mr. J. Paul Jones. We were pleased to notice the interest manifested by the master mechanics. The composition of materials used in the manufacture were frequently spoken of, and were favorably indorsed. It was a surprise to many when their attention was called to the wrench department, and more so when they read the conspicuously displayed decision of Judge Lowell in the case of the Collins Company vs. L. Coes and A. G. Coes & Co. As many were ignorant of the fact that the firm of Collins & Co. were manufacturers of wrenches, the interest taken by this firm in placing before this convention their productions pertaining to railroad work was appreciated.

Mr. E. B. Mealyard and P. E. Merrihew, 135 La Salle street, Chicago, exhibited an interesting working model of an iron car construction which attracted much attention, also an all-iron truck for freight cars.

Mr. Thomas McGregor, of Dayton, Ohio, exhibited a model of a balanced slide valve for locomotives, so arranged that the pressure of steam on the face of the valve should be equal to its weight, and thus reduce friction to a minimum.

Messrs. Joy and Turner made a fine display of drawings and photographs, illustrating the Joy reversing and expansion gear, and its application to the Webb-Joy locomotive.

Mr. Wesley Crouch, of Rochester, N. Y., showed two cars on a truck, provided with his air-cushioned bumper and draw-head. In this arrangement the shock of compression and the jerk on the draw-head in starting are taken up by a cushion of air in a cylinder, from which it can only escape slowly through small openings.

W. V. Perry, Chicago, general agent for the Perry Safety Car Coupling, showed working models of a device by which the usual dangers to which brakemen are subject in coupling and uncoupling cars are avoided. The link is controlled by levers which can be managed by a brakeman standing beyond the ends of the ties. The pin may be so set that the link, entering the draw-head, will cause it to drop into place, and it may be withdrawn by a chain connecting with the top of the car, from which point the link may also be controlled in coupling.

The American Brake Co., St. Louis, showed working models of their automatic freight-car brake.

Mr. C. H. Kellogg, Buffalo, N. Y., exhibited a Standard freight-car truck of the pattern accepted by the Western Railway Association, and in use on the B., N. Y. & P. R. R.

To those who are familiar with the construction of channel-iron trucks, it is only necessary to say, in explanation, that the heavy cast-iron head-pieces usually employed are, in this system, done away with, and wrought-iron gusset or corner plates substituted therefor. These plates are riveted or bolted to the flanges of the channel cross-frame and the arch, or truss-bars in the side-frames—this point being in either case one of vital importance, the sole means of keeping the truck "square," and connecting the frames together. It is claimed that wrought is more suitable than cast iron for this purpose. By their use—the labor being the same as with cast iron—the relative cost lies in the material used, which is as follows per car: 396 pounds cast iron, at 2 cents, \$7.92; 96 pounds wrought iron, at 4 cents, \$3.84; in favor of wrought iron, \$4.08. This includes the ordinary method of hanging the spring plank from journals placed on top of the channels, but in this there is in addition what are termed short hangers. They pass through the lower flange of each channel, a slot being cut for them, and each end is supported by a pin 3 inches long resting in a cast-iron lining. These pins are made with a square seat for the hangers, so that there is no wear on them. The saving in material is \$3 per car over any other style, and it can be used in all trucks when cross-frames are of channel iron. The advantages to the vau are that in removing the spring beam or springs it is not necessary to clamp the timber together, nor to remove the pins; simply jack up the car, or run the truck from under it and the timber will lift out without removing a bolt. They are running successfully, and the patents are accepted by the Western Railway Association. The patentee and owner is Mr. C. H. Kellogg, Buffalo, N. Y.

The Washburn Car Wheel Company, of Hartford, Conn., exhibited a fragment of one of their steel-tired cast-iron wheels, broken under a drop and planed on one side to show the weld. These wheels are made with hammered and rolled crucible steel, into which, while at a melting heat, the cast iron is poured, making what seems to be a good union. The service of these wheels on the Boston and Albany Railroad has been

very remarkable, over 1000 having made mileages of 150,000 to 200,000 miles, under passenger and baggage cars, and still in use. Some of them have made over 300,000 miles, with a prospect of further service.

Mr. Andrew Warren, St. Louis, showed a model of a freight car door, secured by a Standard car door fastener.

Mr. Geo. S. Strong, Philadelphia, filled a table with drawings and blue prints of his locomotive drill coupling, stayless locomotive fire-box boiler, water-pumping apparatus for railway water stations, and locomotive feed-water heater.

The Bucyrus Foundry and Mfg. Co., of Bucyrus, Ohio, exhibited a photograph of Thompson's steam excavator and wrecker for railroad work.

Josiah Wright, Springfield, Mass., exhibited Johnson's car brake, designed to supplant the old wheel brake, especially on box cars, where they are inconvenient and dangerous. The brake is applied by moving a lever by hand, and thrown off by pressure of the foot on a short lever under the brake frame. The whole operation is performed from the running board.

The Paige Wrought Metal Car Wheel Company, Springfield, Mass., showed wheels of their manufacture which have come into use on a number of roads. These wheels are constructed with a steel tire 3 1/2 inches deep through the tread. The tire is not heated, but is secured in place in its cold state as received from the rolling mill, by having two wrought metal side plates, each 1/2 inch thick, forced in by hydraulic pressure, and forced on to the hub at the same time. The metal of tire being then turned down over the plates riveting them, and to make them doubly secure there are 18 3/4-inch bolts around the tires, six going through the 3 1/2-inch wide flange on the tire, and six 3/8-inch bolts through hub. There is no filling between plates. The hubs can be made of wrought metal in two parts if so desired. Mr. Paige claims that this wheel is so constructed that it will take up more vibration than any wheel now in use, for the reason that there is a space of 2 1/2 inches in 28-inch wheels, 3 1/2 inches in 30-inch, and 4 1/2 inches in 33-inch, between the flange on the inside of the tire and the flange on the hub, leaving a clear space much lighter for this purpose, and saving the axle from crystallizing, making them less liable to break.

L. B. Flanders, Philadelphia, exhibited some grease boxes for cars and a model of a planer for planing locomotive links, so arranged as to give the cut any curvature desired. It attracted a good deal of attention.

Geo. Butler, Cincinnati, exhibited his excelsior draw-bar attachment, buffer and spring protector. Its especial value consists in the fact that while the spring is allowed to exert its full force to resist concussion, it is protected against being itself crushed or hammered together, so that it retains its elasticity unimpaired after long service.

The Ashcroft Mfg. Co., New York, exhibited a steam gauge taken apart and spread out on a table to show its construction and operation.

Some other exhibits were placed in position later, but our correspondent did not have a chance to see them.

### The National Association of Stove Manufacturers.

The National Association of Stove Manufacturers met on Wednesday last at the Cataract House, Niagara Falls. The meeting was called to order at 12 m. Mr. Wm. H. Whitehead, of Chicago, President, in the chair. About thirty houses were represented.

After the passage of a vote of thanks to Mr. Whitehead for his address, the Executive Committee presented a report recommending that the sessions be secret. This was carried.

The association sat for two days with closed doors.

### OBITUARY.

#### MAXWELL ROWLAND.

Maxwell Rowland, Sr., of the well-known shovel manufacturing firm of Maxwell Rowland & Co., died on the 20th inst. at his residence in Holmesburg, Pa., of Bright's disease. He had been in ill-health for about a year, but had only been confined to the house for the past three months. At the time of his death Mr. Rowland was in his sixtieth year. He was born in this city, his father being Jonathan Rowland, the founder of the house. The manufactory, in its early days, stood almost on the sight of the present building, and near what is now called Rowland's Station, on the Pennsylvania Railroad. Maxwell and his brothers, upon reaching manhood, were admitted to the firm, the firm name being Johnathan Rowland & Son, which, upon the death of the father, was changed to Johnathan Rowland's Sons. It was subsequently changed to its present title, Maxwell Rowland & Co. The house is one of the prominent industries of Philadelphia, and besides supplying a large home trade, does considerable exporting of its products. Mr. Rowland was a well known and highly respected citizen. He was elected for one term to Select Council, and served with ability. He was at one time President of the Bustleton and Homesburg Railroad Co., which has since been merged into the Pennsylvania Railroad.

Alfred Sellers, formerly of the cutlery firm of John Sellers & Sons, and who spent some 15 years of his life in the United States, died near Sheffield, England, on the 10th inst., of paralysis.

**Negotiability of Bills of Lading.**—A recent decision of the Supreme Court of the United States invalidates a long practice of merchants concerning the negotiability of bills of lading, and deserves wider publicity than it has yet received as a means of correcting a prevalent error. In the test case a bill of lading had been signed by the agent of a Southern shipping concern for a lot of cotton that was never shipped, and in consequence of non-delivery failed to make good the money paid by a third party upon a

draft to which the bill had been attached. The victim sought to recover from the principal of the agent who signed the bill of lading, on the popular notion that, having paid the draft in good faith on the representation of the bill of lading which the defendant had allowed to be issued, the latter is bound to make good the amount involved. The popular view of the law in such cases has been that the bill of lading possessed all the elements of negotiability which belong to a bill of exchange or a promissory note. The Supreme Court, however, has decided that it is not a negotiable instrument or obligation in this sense. According to Mr. Justice Miller, "its transfer does not preclude, as in those cases, all inquiry into the transaction in which it originated because it has come into the hands of persons who have innocently paid value for it. The doctrine of bona fide purchases only applies to it in a limited sense. It is an instrument of a two-fold character. It is at once a receipt and a contract. In the former character it is an acknowledgment of the receipt of property on board the vessel by the owner of the vessel. In the latter it is a contract to carry safely and deliver. The receipt of the goods lies at the foundation of the contract to carry and deliver. If no goods are actually received there can be no valid contract to carry or to deliver."

### WASHINGTON NOTES.

(From Our Own Correspondent.)

WASHINGTON, D. C., June 28, 1882.

#### THE LABOR QUESTION IN THE SENATE.

The subject of the labor strikes promises to become a matter of Congressional inquiry. In the Senate Mr. Morgan, of Alabama, has submitted a resolution in the following terms:

"Resolved: 1. That a select committee of seven Senators be appointed by the Chair to take into consideration the subject of labor strikes in the United States, and to inquire into the causes thereof, and what measures can be properly provided to modify or remove such causes of disturbance, and to provide against their continuance or recurrence. 2. That the said committee shall have leave to sit in vacation, and to visit such places in the United States as they may deem proper to obtain necessary information under these resolutions; and to send for persons and papers, to administer oaths, examine persons under oath, and to cause depositions to be taken and certified under such regulations as they may adopt. 3. That said committee shall have power to appoint a clerk, at a salary of \$6 a day, and a stenographer, and a sergeant-at-arms, from the messengers of the Senate; and the actual and necessary expenses of said committee, properly incurred in the execution of these resolutions, shall be paid out of the contingent fund of the Senate."

The Senator from Alabama supplemented this resolution by stating that he had no desire to serve upon this committee, as he would be otherwise engaged during the summer, nor did he have any party purpose, because he did not know whether the persons engaged in these strikes were Republicans or Democrats, but merely wished for information of an authentic character, as the subject seemed to be absorbing a great deal of attention of late. He said that he was ignorant of the causes of this great industrial agitation, and that it was the duty of Congress, in the protection of the industrial classes, as well as in the protection of capitalists, to look into this question through one of its select committees.

The Senator from Alabama then submitted the following memorandum of strikes which he stated had occurred since the first day of March:

March 1.—There was a strike of railroad laborers at Omaha, attended with a riot.

March 2.—Hatters at Danbury, Conn., and the First Regiment of National Guards were called out.

March 6.—Four hundred Bessemer steelworkers at Homestead, Pa., were on a strike, and 300 rolling mill men.

March 14.—A large number of miners at Cumberland, Pa.

March 20.—Thirty-seven hundred operatives at the Pacific Mills, Lawrence.

March 21.—One hundred coopers, Williamsburgh; 200 starch makers at Glen Cove, L. I.

April 3.—Three thousand coal miners at Pittsburgh; 300 laborers at Weehawken Tunnel.

April 7.—Five hundred carpenters; 300 female shoemakers at Toronto, Canada.

April 8.—Four hundred boom boys at Muskegon, Mich.

April 16 to 31.—Two hundred and fifty bricklayers at Fall River; plumbers, trunk makers, bricklayers, 2300 carpet makers and others were engaged in strikes. There were 10,000 strikers at Cohoes, N. Y. (occupation not given).

May 8.—Three thousand miners at George's Creek, Md.

May 20.—Eight hundred tanners at Chicago.

May 27.—Twelve hundred rolling mill employees at Cleveland.

May 31.—Five thousand ironworkers at St. Louis.

June 1.—One hundred thousand, including all involved with strikers in Pittsburgh district; 2000 at Bay View, Ill.; 10,000 at Wheeling; 1500 at Cincinnati, and at Chicago, Louisville, Youngstown, Bellaire, &c., there were some 1700 employees of the Pennsylvania Central Railroad that struck. The Senator continued that this footed up no less than 100,000 persons, and allowing an average of five persons dependent upon each one, would make 500,000 human beings immediately and directly affected by these strikes, and the effect upon the other industries, especially the agricultural, commercial and transportation industries, must be enormous. He claimed that the seriousness of the present movement was augmented by the fact that the participants confined themselves to what might be called legal operations, instead of the riotous acts of the strikes of 1877. This, he thought, increased the importance of the proposed inquiry. He stated that there were "103 iron mills closed and 2052 furnaces in the Ohio River district and west of it." That the "Amalg-

ated Association is upward of 80,000 strong," composed of operatives and laborers, and that there exists a corresponding organization on the part of the capitalists.

This explanation of the facts which led to the introduction of the resolution led to considerable discussion. Senator George, of Mississippi, favored the resolution. Senator Morrill, of Vermont, favored the object, but suggested that the question of a commission be referred to the Committee on Education and Labor. Senator Hoar, of Massachusetts, said that some years before he had introduced a commission of inquiry, which should be a permanent board, and having in view this very object, and that it received the approbation of the great labor organizations, and was adopted by the house by a large majority, but was attacked in the Senate and defeated by a small majority. Senator Morgan accepted the suggestion of reference to the Committee on Education and Labor. Senator Blair said the committee would act promptly. The resolution was very generally favored, and its reference to the Committee on Education and Labor was finally agreed to.

#### ADJOURNMENT.

Although there is considerable agitation upon the subject of adjournment, the Committee on Ways and Means are still making every effort to bring about such a desirable result. The condition of business in both houses of Congress, however, is such that the prospects of getting away before the latter part of July are not flattering.

#### THE TARIFF COMMISSION.

The President has called a meeting of the Tariff Commission to be held in this city on July 6, for the purpose of organization and selection of a place of meeting and a general mapping out of the business of the commission and the scope of inquiry. There have been various speculations upon the latter feature of their work, but it appears that there is no authority for any statements on that subject, as the commissioners have not yet met, and some of them are entire strangers to their colleagues. Commissioner Porter has received some letters suggesting him as secretary to the commission. Saratoga has a majority of the members as the place of meeting.

#### THE "SPRAYED" HOOP CASE.

The Assistant Secretary of the Treasury has addressed a letter, under date June 27, 1882, to Mr. John S. Leng, New York City, informing him that his letter of 23d inst., requesting a personal conference with the Secretary in relation to the Hoop Iron Case, has been placed before him, and directing him to state that, as the case has been given a very full consideration upon two hearings, he must request to be excused from further considering it. The Assistant Secretary adds that Mr. Leng's remedy now, if dissatisfied with the decisions, is by an appeal to the courts. This disposes of the sprayed hoop case. The first decision that they were hoop iron, therefore, is reaffirmed.

#### THE CAR AXLE CASE.

The Secretary of the Treasury again had the car axle case under consideration on Saturday, without reaching a final conclusion. The case, it was thought, was decided that the axles were forgings, but it has been reopened. There is no doubt that it will now be disposed of in a few days.

#### THE ACTION OF THE COMMITTEE ON THE STRIKES.

The Senate Committee on Education and Labor, to whom was submitted the resolution to create a commission to investigate the causes of the pending strikes and other industrial agitations in the United States, expect to report back to the Senate to-day a resolution authorizing the inquiry to be made by their committee, instead of by a commission. The original resolution has also been so amended as to enlarge the scope of the inquiry and to embrace the relations existing between capital and labor, as well as the question of the strikes and their causes. The committee also ask permission to sit during the adjournment, with instructions to report to the Senate in December.

#### THE TEST COMMISSION.

General Campbell, chairman of the House Committee on Manufactures, has been in consultation with the friends of the bill to create a commission to make tests of the strength and other qualities of iron and steel, and has some expectation of securing its consideration and passage. The extension of the session of Congress for several weeks at least, by the emphatic negative of the House proposition to adjourn on July 10, gives this important measure some chance. The necessity of the experiments is not denied, but the usual scramble among members toward the end of the session to secure action upon bills more directly affecting their individual political interests, puts a measure of general importance to the whole country at somewhat of a disadvantage.

A few days ago one of the large furnaces at the Lochiel Iron Works, near Harrisburg, Pa., chilled. When work was begun to clean it out, preparatory to again blowing it in, a solid mass of iron, at least 40 or 50 tons in weight, was encountered. Chiseling, sledgeing and other modes were resorted to in order to break the metal so that it might be dislodged, but they were unsuccessful. It was only after the repeated use of dynamite that the iron was broken, and then into only three pieces. Each of these weighed a number of tons, and it was with great difficulty that they could be taken out. One of the columns of the furnace was shattered by the force of the dynamite, and it will be some time before the furnace will be repaired sufficiently to be put in operation.

The Suez canal is exerting a transforming influence on the commerce of the entire Eastern world. As a financial enterprise its success appears to have been demonstrated. This year the net receipts above all expenses will probably exceed \$1,000,000. There passed through the canal during the three months ending 31st March 313 vessels, against 260 in the corresponding months last year. One effect of the canal is to hasten the substitution of steam for sailing vessels, as the latter are unable to navigate the Red Sea.

### METALLURGICAL NOTES.

#### COBALT MINING IN GREAT BRITAIN.

The *Mechanical World* says that the only cobalt mine worked in the British Isles is Foel Hiraddug Mine, in the parish of Cwm, near Rhyl. The ore occurs in the carboniferous limestone, which seems to have furnished a good deal of iron ore from shallow pockets, judging by the numerous pits scattered about near the mine. In working one of these pockets cobalt was discovered. Black strings in the limestone were observed, and on testing them with the blow-pipe, it was ascertained that the black color was due to oxide of manganese in some cases, and to oxide of cobalt in others. On further examination of the pit a vein of cobalt ore was discovered, and has now been worked continuously on a small scale for several years.

#### A NEW MINERAL.

Profs. F. W. Clarke and N. W. Perry, of the University of Cincinnati, propose the name of "gunnisonite" for a new and peculiar mineral, associated with calc-spar. It is easily scratched by a knife and is deep purple in color. Analysis yielded the following results:

Fluorine.....	31.96	Carbonic acid.....	5.61
Calcium.....	45.91	Soda.....	0.74
Silica.....	6.02		
Alumina.....	5.21	Total.....	95.45

Further investigation will probably determine whether the body is a definite and distinct species.

#### THE USE OF LIGNITE OR BROWN COAL IN THE BLAST FURNACE.

In a paper bearing the above title, and read at the recent meeting of the British Iron and Steel Institute by Professor Von Tunner, of Loeben, Austria, it was stated that probably from one-quarter to one-third of the coke made could be supplied by the newer brown coal dried in a kiln, or by older brown coal in its raw state, whereby 100 parts of coke would need to be supplied by 160 parts of brown coal. The application of newer brown coal for the production of pig iron was under consideration as far back as the year 1806, in Styria, but not until 40 years afterward was attention to the subject revived, and it was then approached in several directions. The Imperial Ministry at Vienna had bestowed special attention upon the matter, and the earlier existing metallurgical association of Upper Styria determined to undertake experiments on a large scale, because all the trials previously made on a small scale had led to no decisive results. All the efforts, however, for bringing together the means necessary for these experiments were in vain, which is all the more easily accounted for because no fixed programme was drawn up as to how, when, and under whose management the work was to be carried out. On the 6th of June, 1880, however, the Metallurgical Association of Styria and Carinthia resolved to take up the subject once more, and appointed for this purpose a committee, from which, up to the present time, only one statement has emanated, being an article entitled "Remarks on the Application of Brown Coal to the Production of Pig Iron." The author of the paper remarked, however, that he could scarcely describe himself as bringing forward anything absolutely new, or any immediately practicable proposition to be directly carried out, and he merely stated and in part endeavored to answer the two following questions: 1. Is the production of pig iron with brown coal, from a theoretical point of view, possible or not? 2. Is the production of pig iron with brown coal practically workable or not?

To the first of these questions the answer returned was that the application of raw as well as coked brown coal to blast-furnace working was by no means impossible, and there remained, therefore, nothing more to be added on that point. As regards the second question, it is perfectly evident that the difficulty of working the blast furnace with brown coal was to be found in the largeness of the grain and consequent density of the smelting column, and in considering this difficulty the author thought that his attention should be confined to ascertaining what method appeared most likely to supply a great part of the production of pig iron with brown coal used as fuel, or the coke extracted from the brown coal. He accordingly confined himself to the application of brown coal to the production of pig iron, that is, to the composition of a mixed charge (one-quarter to one-third brown coal with three-quarters to one-quarter coke) whereby important results have already been obtained in Austro-Hungary, and he remarked that a still higher degree of success would have been obtained if the price of fuel were not so high as to be a serious drawback. Professor Von Tunner states that, with the exception of Kalan, the blast furnace has nowhere been worked with brown coal successfully, and even in that place, under the management of a gentleman well known in metallurgical circles, the practice answered only for a short time, and not without serious interruptions in the working. The experiments had, moreover, been made in the old-fashioned blast furnaces which were constructed for working with charcoal or coke, and without any regard to the special requirements of brown coal. With a mixed charge very good results have sometimes been obtained, some of which might have been still better if only a stronger blast had been at command, such as would be necessary to succeed in the working of a furnace charged with anthracite. The reason why the results until now obtained by mixed charges and with different varieties of brown coal are so unequal, is not due so much to the more or less inadequate character of the furnace in blast as to quality of the brown coal used for that purpose. There exists, in fact, a great dissimilarity in the composition and properties of the brown coal employed. Although obviously very rich in sulphur and ash, brown coal should nowhere be used for this purpose; yet there is to be found in the grade of inferior quality, by heating and partly even by drying, a great difference in the tendency to burst. It is known that the property of containing more or less water is decisive for the bursting in brown coal. Moreover, some brown coals are saturated



by resin or bitumen to such an extent that, even if purposely dried, it oozes out more or less. There is in this respect an essential difference, not only in the geological formation of the brown coal, but in the different seams of one and the same formation, and even in the different section of the same seam this difference is to be found. Before brown coal, therefore, is tried for blast furnace purposes, its composition and quality should be closely examined. With the careful examination and selection of the coal at command, success may crown the efforts to use it successfully in blast furnaces.

Professor Von Tunner thinks that the first practical experiment in this direction should have been made in a cupola instead of a blast furnace, because the interruptions occurring in working cupola furnaces are under control, and incomparably shorter and less costly than those of the blast furnaces. The process of reduction is, moreover, more easily accomplished, and there is little slag to deal with. The coal should, moreover, not be used in cupola furnaces for the production of pig iron, but only for the melting of pig iron, and not until this more simple operation is successful and experience has been gained in the action of the coal, should it be extended to the complicated operations of the blast furnace. Although the coking of the raw brown coal under high pressure, with or without superheated steam, prevents to some extent the decrepitation of single pieces of crushed coal, it yet appears that the greater cost of this application is not covered by the better yield thereby obtained from the larger pieces of coal, and therefore this method, which has been tried in the different portions of Austria, has been given up. The statement that useful coke is obtained by a mixture of very poor with richer coals has been proven at Creusot, in France, where about equal parts of the two sorts were mixed in the coke oven. In the experiments hitherto carried on, and briefly referred to in the above remarks, the special properties of brown coal were not taken into account, while the furnace used was intended for the consumption of charcoal or coke. Professor Von Tunner directed special attention to the construction of the furnaces at Guenyeveans, in which the stoke above the boshes, instead of rising directly upward, as is usually the case, appeared to be divided vertically into two equal parts. One of these parts (which stands not quite horizontal, but obliquely) is provided with peculiar shafts at the top, and is for the coking and preparation of the brown coal, and the other for the roasting and preparation of the iron ore and the requisite flux. The burden of the red-hot coke of brown coal and the red-hot ore consequently first meet at the level of the boshes. By this means important advantages in favor of the possibility of working with raw brown coal should be obtained, among which the smaller pressure on the light, friable brown coal coked, the lighter rising of the gases in the dense, but low, smelting column, and the possibility of more readily overcoming occasional interruption, ought to be especially pointed out. It must be left to the future and to greater experience in the working of the blast to determine whether the above suggestion should go into every-day use.

Secretary Folger has written a letter to each of the members of the Tariff Commission, requesting them to attend in Washington on the 6th of July, for the purpose of organization.

### Special Notices.

#### Iron Furnace Wanted.

Parties having good trade in the Eastern States desire the exclusive agency for some furnace, making good foundry iron, for the sale of its product. Liberal advances made if required on iron. Address, **MERCHANT,**

Office of *The Iron Age*, 83 Reade St., New York.

### FOREMAN Wanted.

For small foundry (15 molders). Must be thoroughly competent, especially on light bench work, principally hardware. Address, **W. S.,**

Office of *The Iron Age*, 83 Reade St., New York.

**WANTED.**—A situation as Superintendent or Manager of Blast Furnace or Ore Mine. Either Hot or Cold Blast Charcoal or Coke. Eleven year's experience. Best of references. Address, **MANAGER, Box 7,**

Office of *The Iron Age*, 83 Reade St., New York.

**WANTED.** A position as general Mechanical Engineer, by a man experienced in all the details of Stationary, Portable and Marine Engine and Boiler work, Pattern making and foundry work, also experienced in designing and draughting all kinds of new machinery and estimating the cost and price, and in the systematic and economical management of help. Unquestionable reference offered. Address, **C. D., 57 East 6th Street, Oswego, N. Y.**

#### Blast Furnace Manager.

A Pennsylvania Mining Company having some very superior beds of Ore intend to build a furnace, and need an experienced and reliable manager, or would entertain a proposition to build the furnace in joint interest. Coal, Ore, Limestone and Fire Clay within one or two miles of each other, and railroad facilities very good. Address, **BLAST FURNACE,**

Office of *The Iron Age*, 220 S. 4th St., Pottsville, Pa.

**WANTED.**—A position for a thorough Hardware man, and the agent connected for a long time with a large firm, Co. in this city—Co. now retired. Have filled the following positions in the above manner: Bookkeeper, Cashier, Office Manager, Purchaser, Salesman in house and traveling. Personally acquainted with and visited all the leading hardware stores in the U. S. Have also held the position of S. C. Have the best testimonials and a good record. Moderate and reasonable as to salary. Will take any position I have in mind. Can sell as many goods for a leading firm as any one in the S. Address, **HARDWARE, 55 East 13th Street, New York.**

#### Wanted.

Second-Hand Horizontal Engine, about 26 inch by 6 in. h. 200 valve preferred. 8-in. Hand Fly Wheel, 30 feet diameter, and to weigh about 3 tons. Also, Second-Hand Wellman Blower. Address, **P. O. BOX 737,**

PHILADELPHIA, Pa.

**PUNCHING PRESS AND SHEARS FOR SALE.**—New Hollander's Punching Machine, 24 inch throat. Punches 3-4 hole in 4 in. Also Power Press, cutting 3-4 hole in 27-in. 18 inch throat. Also larger sizes, single and combined. **FEELERS' PUNCH AND SHEAR CO., 35 W. 12th Street, New York.**

### Special Notices.

#### Furnace Property For Sale.

Will be sold at a low price. The Charter, Rights and Real Estate of the Bloomsbury Iron Co., together with such portions of the stock of materials and other personal property as purchasers may require. The real estate consists of two blast furnaces favorably known as the Ironside Furnaces, in good condition, steam engine, water power of 100 to 200 horse-power, lands with extensive iron mines, storehouse, numerous dwelling houses, R. R. tracks and sidings several miles in length (connecting the furnaces with the Canal and Railroad), canal wharves with tracks and facilities for receiving and shipping large quantities of freight with economy and dispatch, either by canal or railroad.

This property is situated at Bloomsbury, Pa., within 30 miles of the Wyoming Coal field. The furnaces have been in continuous and successful use for 37 years. The Company own in addition extensive and valuable ore mines in Snyder Co., Pa.

All the property is in good order and now in profitable use. For further information apply to **CHAS. R. PAXTON, President,**

Bloomsbury, Pa.

#### DESIRABLE MANUFACTURING SITE For Sale or Rent.

Being the extensive property formerly occupied by the **BUFFALO IRON AND NAIL WORKS AT BLACK ROCK, IN THIS CITY.**

The buildings cover over three acres, and are of brick and wood, substantially constructed, and with slate roofs. They could easily be changed, if necessary, to suit almost any kind of business. Water and railroad communication to all parts of the country.

Maps of the property, with full description, sent on application. **P. P. PRATT or F. L. PRATT,**

Buffalo, N. Y.

#### The Sherman Process Co.

9 Pemberton Square, Boston, Mass., Issue Licenses to use the Process for the Manufacture of Iron and Steel

In the Bessemer Converter, Crucible, Siemens Martin, Puddling, Blast and Cupola Furnaces. The use of this Process improves the quality of the product, saves fuel and labor, and does not require any change in furnace or manner of working. See page 17 of *The Iron Age* of Oct. 25th, 1877.

#### For Sale.

The Industrial Works of Shamokin, owned and successfully carried on for a number of years by the late Wm. Brown, consisting of Foundry and Machine Shop, and a large stock of Patterns regarded as part of the property. Boiler Shop, Blacksmith Shop and Factory for the manufacture of heavy coal screens. Well located in the borough of Shamokin, Pa., with the best facilities for shipping by rail, and surrounded by a district contributing all the work that a shop of that kind can possibly turn out. The works are now running, but in a very short time possession can be given. Easy terms of payment are offered to suit a purchaser of limited capital. Offered for sale by **WM. McILVAIN & SONS,**

Reading, Pa.

#### Hardware Business For Sale In Western New York.

Stock of hardware, stores, linens, etc., in elegant brick store; three new railroads now building, and trade rapidly growing. A good party wishing a fine business will do well to investigate. Address, **W. W., Box K,**

Office of *The Iron Age*, 83 Reade St., N. Y.

#### For Sale.

The largest stock of New and Second-Hand Engines, Boilers, and general Machinery in the West. Send for Catalogue. Holding Outfits for Coal Mining and other purposes a specialty. **WARREN SPRINGER,**

195 to 219 South Canal St., Chicago.

#### FOR SALE LOW.—ENGINE.

A Vertical High-Pressure Steam Engine, complete. Cylinder, 24 in. by 48 in. Built by A. J. Sweeney & Son. Can be seen in daily use at our mill factory. **LA BELLE IRON WORKS,**

Wheeling, West Va.

#### For Sale.

One pair good, sound CHILLED ROLLS, 25 in. x 60 in., made by A. Garrison & Co., Pittsburgh. No use for them. Also a HEATER, 18 in. x 60 in., with 22 2-inch tubes. Been used some. Will sell cheap. **CHAS. FULTON & SONS,**

Cotatesville, Chester County, Pa.

#### Machinery For Sale. (ALL NEW).

One 20-in. Power Drill Press. Three 20-in. Davis Power Drill Presses. Six Hand Blacksmith Drills. Three Gear Cutting Attachments for Lathes. Twelve Assorted Chucks, 4 in. to 18 in. One Bolt Cutter, 4 in. to 18 in. Three Barbed Lathes. Six Hand Shearing and Punching Machines. Two Star-tyrant Blowers. Also, one second-hand Horizontal Engine, 12 in. x 24. One second-hand Horizontal Engine 10 in. x 16. **JACKSON & TYLER,**

16 and 18 S. Howard St., Baltimore.

#### For Sale.

Two Corliss Condensing Beam Engines, 32 in. x 72 in. cylinders. Address, **THE HARTFORD ENGINEERING CO.,**

Hartford, Conn.

#### NEW ENGINE LATHES.

Ready for instant shipment; with modern improvements; 16, 17, 18 and 20-inch swing, by from 6 to 16 feet bed. Call on or address **S. C. FORSAITH & CO.,**

Manchester, N. H., or 209 Center Street, N. Y. City.

#### Export.

An American of middle age, with a long business experience in Foreign countries, is making up a voyage to the East Indies, Australia, New Zealand and Cape Colony, Africa, and will take a sample line of American hardware, machinery and specialties, if a sufficient number of responsible houses apply. Solid references given. **TRAVELER,**

P. O. Box 452, New Haven, Conn.

### Special Notices.

#### SECOND-HAND AND NEW

### MACHINERY.

JUNE 15, 1882.

The following new and improved Machinists' Tools are now in stock and ready for delivery:

1 30 in. x 30 in. 8 ft. Planer. New. June.  
1 42 in. swing, 10 ft. bed New Engine Lathe. June.  
1 26 in. swing, 12 ft. bed New Engine Lathe. June.  
1 22 in. swing, 13 1/2 ft. bed New Engine Lathe. June.  
1 10 in. swing, 10 ft. bed Engine Lathe. June.  
1 11 in. Shaper, 25 in. Traverse. June.

The following on hand.

2 30 in. swing, 18 ft. bed Engine Lathes. New.  
1 26 in. swing, 10 ft. bed Engine Lathe. New.  
1 22 in. swing, 14 ft. bed Engine Lathe. New.  
1 10 in. swing, 8 ft. bed Engine Lathe. New.  
1 18 in. swing, 8 ft. bed Engine Lathe. Tilted carriage.  
1 15 in. swing, 11 ft. bed Engine Lathe. Tilted carriage.  
1 12 in. swing, 8 ft. bed Engine Lathe. New.  
1 15 in. swing, 9 ft. Hand Lathe. New.  
1 12 in. swing, 8 ft. Hand Lathe. New.  
1 10 in. swing, 4 1/2 ft. bed Hand Lathe. New.  
1 26 in. x 26 in. x 5 ft. Planer. New.  
1 26 in. x 3 ft. Iron Planer. Second-hand.  
1 38 in. swing Upright Drills. B. G. & S. F. New.  
1 26 in. Drill. B. G. & S. F. New.  
1 20 in. Drill. New.  
1 40 in. Drill. Second-hand.  
1 30 in. Drill. Second-hand.  
1 20 in. Drill. Second-hand.  
1 20 in. Shapers. New.  
1 10 in. Shapers. New.  
1 Pratt & Whitney Hand Mill.  
1 Sellers Milling Machine. Second-hand.  
1 Face Milling Machine. 2d hand.  
1 Ford's Patent Centering Machine. Second-hand.  
1 No. 2 Screw Machine. New. Turret Head.  
1 No. 2 Screw Machine. w/ feed. New.  
1 No. 1 Brown and Sharpe Screw Machine. 2d hand.  
1 Screw Head Slicer. Second-hand.  
1 Second-hand Profiling Machine.  
1 46 in. Ryde's Patent Centering Machine. New.  
1 Emery Grinder. Second-hand, for 10 in. Wheels.  
1 Pipe Cutting Machine. Second-hand. 2 in.  
1 Bolt Pointing Machine. Second-hand.  
1 Double Nut Tapper. New. Horizontal.  
1 Horizontal Boring Machine, 10 in. swing. 2d hand.  
1 46 in. Ryde's Patent Centering Machine. New.  
1 Double-Acting Presses No. 3. Nearly new.  
1 Single-Acting Press for power. Nearly new.  
1 Foot Press. New.  
1 Medium Power Punching Press. Second-hand.  
1 Small Power Punching Press. Second-hand.  
1 Foot Press. New.  
1 Lat Piston Machinery. Second-hand.  
1 Grindingstones and Frames. New.  
1 Steam Hammer. Cylinder 6 1/2 x 12. Second-hand.  
1 Lot of Forges, 1 Slat Tenoner, 1 Railway Saw Bench.  
1 Foot power Circular Saw.  
Cold-roll-d shafting, Pulleys, Hangers, Couplings, &c. always in store.

#### The George Place Machinery Company, 121 Chambers and 103 Reade Sts., New York.

#### For Sale.

#### Palo Alto Rolling Mills,

Near Pottsville, Pa.,

ON THE MAIN LINE OF THE POTTSVILLE

AND READING RAILROAD.

These mills are in good repair, and can be started in two days' time. Rolls for T-Rails 12 to 70 lbs. per yard, and for Street Rails 18 to 70 lbs. per yard. Guide Mill Train for Merchant Iron 1/4 to 1 inch. Rolls for Merchant Bar, round and square, up to 4 1/2 inches.

Number of Puddling Furnaces in both mills, 30; Heating Furnaces, 3; all with boilers attached. Also Foundry, Machine Shop, Blacksmith shops, Iron House, Roll House, Carpenter and Pattern shops, Stables, handsome dwelling for Superintendent, 12 Tenement Houses, a Brick Office, and ample grounds for stock and cinder. For further particulars address

**Messrs. LEE & McCAMANT, Extrs.,**

Pottsville, Pa.

**THOS. F. WRIGHT,** 184 Race St., Philadelphia, Pa. **HUGH W. ADAMS,** 56 Pine St., New York.

#### E. BISSELL & CO.,

Wholesale Hardware Auctioneers,

83 Chambers and 65 Reade Sts., N. Y.

Sales held weekly for the trade. Consignments solicited. We refer to the leading Manufacturers and importers.

#### Wanted.

A Practical Elliptic Spring Maker,

COMPETENT TO TAKE CHARGE OF SHOP.

Address, with reference, **P. O. DRAWER 11,**

Bridgeport, Conn.

#### IRON AND METAL

Exchange Memberships

Bought and Sold by

**WM. WILLIS MERRILL,**

4 Stone Street, Room 69.

Dealer in

**EXCHANGE MEMBERSHIPS.**

#### Wanted.

A thoroughly competent GUIDE AND HAND ROLLER to take charge of a NINE-INCH TRAIN OF ROLLS. Parties applying will give full particulars as to qualifications and compensation required for services. Address, **PILLOW, HERSEY & CO.,**

Montreal, Canada.

#### Wanted.

First-class Rolling Mill Superintendent, thoroughly versed in the manufacture of iron in all its details. Also fully posted in the details of Machinery, &c. Address **JAS. G. CALDWELL, Pres't,**

Louisville, Ky.

**WANTED.**—A position to superintend Brass or Iron Works. Am a practical mechanic, and familiar with Engine, Machinery, and general Brass work, especially Kerosene pump. Have had successful experience getting up tools and management of men. Address **W. O. LINCOLN, Bridgeport, Conn.**

PHILADELPHIA, June 12th, 1882.

#### Wanted.

Superintendent for Malleable Iron Works. One familiar with the running of a Blast or Air Furnace preferred. Address, with references and particulars, **M. L. W.,**

2116 Market St.,

St. Louis, Mo.

**TO MANUFACTURERS.**—A gentleman who has an office in New York is desirous of representing goods suitable for the Hardware and House Furnishing Goods Trades. Address **MANUFACTURERS' AGENT,**

Office of *The Iron Age*, 83 Reade St., New York.

### Special Notices.

#### NEW IRON WORKING MACHINERY.

##### ENGINE LATHES.

One 35 in. swing, triple-gear (bed made to suit). Fitchburg. June delivery.  
One 21 in. swing, 14 ft. bed. Fitchburg. On hand.  
One 20 in. swing, 14 ft. bed. Fitchburg. On hand.  
One 20 in. swing, 12 ft. bed. Fitchburg. On hand.  
One 17 in. swing, 8 ft. bed. Johnson. On hand.  
One 16 in. swing, 8 ft. bed. Fitchburg. On hand.  
One 15 in. swing, 8 ft. bed. Fitchburg. On hand.  
One 14 in. swing, 8 ft. bed. Gray. On hand.  
Four 14 in. swing, 8 ft. bed. Fitchburg. On hand.  
One 12 in. swing, 8 ft. bed. Fitchburg. On hand.  
One 11 in. swing, 8 ft. bed. Fitchburg. On hand.  
One 10 in. swing, 8 ft. bed. Fitchburg. On hand.  
One 9 in. swing, 8 ft. bed. Fitchburg. On hand.  
One 8 in. swing, 8 ft. bed. Fitchburg. On hand.  
One 7 in. swing, 8 ft. bed. Fitchburg. On hand.  
One 6 in. swing, 8 ft. bed. Fitchburg. On hand.  
One 5 in. swing, 8 ft. bed. Fitchburg. On hand.  
One 4 in. swing, 8 ft. bed. Fitchburg. On hand.  
One 3 in. swing, 8 ft. bed. Fitchburg. On hand.  
One 2 in. swing, 8 ft. bed. Fitchburg. On hand.  
One 1 in. swing, 8 ft. bed. Fitchburg. On hand.

One 25 in. x 25 in. x 8 ft. Fitchburg. On hand.  
One 20 in. x 20 in. x 8 ft. Fitchburg. On hand.  
One 15 in. x 15 in. x 8 ft. Fitchburg. On hand.  
One 10 in. x 10 in. x 8 ft. Fitchburg. On hand.  
One 8 in. x 8 in. x 8 ft. Fitchburg. On hand.  
One 6 in. x 6 in. x 8 ft. Fitchburg. On hand.  
One 4 in. x 4 in. x 8 ft. Fitchburg. On hand.  
One 3 in. x 3 in. x 8 ft. Fitchburg. On hand.  
One 2 in. x 2 in. x 8 ft. Fitchburg. On hand.  
One 1 in. x 1 in. x 8 ft. Fitchburg. On hand.

DRILL PRESSES, &c.  
60 in. radial drill, first-class make, extra heavy bed plate and table. Weight 4 tons.  
One 48 in. radial drill, self-feed, double gearing and slotted and planed bed. Betts Machine Co. On hand.  
One 30 in. swing, back-gear. Fitchburg. On hand.  
Two 25 in. swing, back-gear. Fitchburg. On hand.  
Three 18 in. swing. Fitchburg. On hand.  
One 15 in. swing, 8 ft. bed. Fox Lathes, Gags. On hand.  
One 12 in. swing, 8 ft. bed. Fox Lathes, Gags. On hand.  
One 10 in. swing, 8 ft. bed. Fox Lathes, Gags. On hand.  
One 8 in. swing, 8 ft. bed. Fox Lathes, Gags. On hand.  
One 6 in. swing, 8 ft. bed. Fox Lathes, Gags. On hand.  
One 4 in. swing, 8 ft. bed. Fox Lathes, Gags. On hand.  
One 3 in. swing, 8 ft. bed. Fox Lathes, Gags. On hand.  
One 2 in. swing, 8 ft. bed. Fox Lathes, Gags. On hand.  
One 1 in. swing, 8 ft. bed. Fox Lathes, Gags. On hand.

**KELLY & LUDWIG,**

49 & 51 N 7th St., Philadelphia, Pa.

#### The Providence Tool Co.,

PROVIDENCE, R. I.

Offers for sale a large quantity of Machinery, which has formerly been employed upon Rifle work, but is now out of use.

There are upwards of 900 machines to be sold, including:

250 Milling Machines of the "Bement," "House" and "Lincoln" patterns  
30 Edging Machines, 20 Engine Lathes, 12 Hand Lathes, 15 Gang Drills, 12 Power Drops (chiefly "Merrill"), 4 Screw Machines, 3 "Bradley's" cushioned Hammer, 10 "Sellers & Parker" Presses.

Also, a complete outfit of Rifle Barrel Machinery (including three trains of Rolls), and of Stocking Machinery, besides numerous special machines.

This sale does not reduce the Company's plant of Machinery for the manufacture of HOUSEHOLD SEWING MACHINES, or of its specialties in HEAVY HARDWARE AND SHIP CHANDLERY.

#### For Sale.

9 in. Merchant Mill, 56 Rolls.  
18 in. Merchant Mill, 6 ft. Rolls.  
Tilt Hammer for Blooms.  
2 48 in. Reynolds Turbines.  
Lever Shears, Cam motion.  
Crocodile Squeezer.  
Heavy Roll Lathe, with small auxiliary Lathe.  
2-ton Chain Blocks, double length chain.

**A. G. BROOKS & WINEBRENER,**

261 N. 3d St., Philadelphia.

#### For Sale.

Hardware Store. One of the best stands in Pennsylvania. Old-established trade of from \$20,000 to \$30,000 per year. Stock very clean, and best reasons given for selling. Address **C. B. O.,**

Office of *The Iron Age*, 83 Reade St., New York

#### For Sale.

4 Noiseless Vertical Engines, 8 x 8 Cylinder. New.  
1 Vertical Engine, 8 x 8 Cylinder. Second-hand.  
1 20 ft. Vertical Tubular Boiler; cast-iron base plate; all complete; in good order. Second-hand.  
1 12 ft. Vertical Tubular Boiler; cast-iron base plate; all complete; in good order. Second-hand.

**F. B. BANNAN,**

STEAM HEATING AND BRASS WORKING,

Pottsville, Schuylkill Co., Pa.

#### BLAST FURNACE

For Sale.

A first-class chance is offered to a party with ten thousand dollars capital desiring to engage in a Furnace Business with a capacity of 15 tons Pig Iron daily. Located in Central Pennsylvania. Coke, Limestone and Ore in immediate vicinity. Address, **BOX 224, BELLEFONTE, PA.**

#### For Sale.

1 Steam Hammer.  
No. 3 Root Blower.  
1 50 H. P. Cut-off Engine.  
1 Steam Crane.  
1 pair Iron Shears.

**KOLB,**

North 15th and 5th Sts.,

Brooklyn, E. D., N. Y.

#### For Sale Cheap.

A 10-TON POWER ELEVATOR, As good as new; built by Whittier Machine Co.; used for a short time by the New York Steam Engine Co.

**JOSEPH LUMLEY,**

144 N. 3d St., Philadelphia, Pa.

#### For Sale.

A nice, clean stock of Hardware and Agricultural Implements, with lease of room, in a town of 4000 inhabitants. For particulars address **106 N. MAIN ST.,**

Dayton, Ohio.

#### For Sale.

New 8 x 8 High Speed Engine, with governor; all complete; will indicate 30 Horse-Power; \$187.50. New



# Trade Report

## BRITISH IRON AND METAL MARKETS.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, JUNE 28, 1882.

**Scotch Pig.**—Prices continue to advance, and the market closes strong with a large business doing. As compared with last week, there has been an advance of 6d in Langlois, Carnbroe and Glengarnock, 1/ in Gartsherrie, and 1/6 in Coltness and Summerlee. The following are to-day's prices for No. 1 brands:

Langlois, alongside, Glasgow	60/6
Coltness	61/6
Gartsherrie	60/6
Summerlee	59/6
Carnbroe	53/
Glengarnock	53/
Eglinton	50/6

Lighterage from Ardrossan to Glasgow is 2/6 per ton.

**Cleveland Pig.**—The market is active, and prices show a tendency toward higher figures. We quote as follows, f. o. b. shipping ports:

Middlesboro' No. 1 Foundry	47/6
" No. 2	45/6
" No. 3	43/6
" No. 4 Forge	43/

**Bessemer Pig.**—The improvement in demand continues, and prices are firmer. We quote W. C. Hematites Mixtures, Nos. 1, 2 and 3, equal portions, 54/ @ 56/ f. o. b. shipping ports.

**Blooms.**—No improvement to note, the market ruling dull and prices weak. Bessemer, 7" x 7", are quoted £4. 12/6 @ £4. 15/ f. o. b. shipping ports.

**Manufactured Iron.**—The market continues quiet, with a moderate business doing. We quote, nominally, as follows:

Staff. Ord. Marked Bars	7 0 0 @ 7 10 0
" Medium	7 0 0 @ 7 10 0
" Common	6 0 0 @ 7 10 0

**Hoops.**—W. G. & over.

" Common Best	8 0 0 @ 8 10 0
" Medium	7 0 0 @ 7 5 0
" Common	6 10 0 @ 6 15 0

**Sheets.**—W. G. & under.

" Ordinary Best	8 10 0 @ 9 0 0
" Common	8 0 0 @ 9 0 0

**Steel Rails.**—There is no change to note. The demand remains light and prices nominal. Ordinary sections are quoted, nominally, £5 @ £5. 5/ f. o. b. at shipping ports.

**Iron Rails.**—The market is unchanged and quotations nominal. Welsh are quoted, nominally, for 30-pound and upward, £5. 5/.

**Old Rails.**—There are but few Old Rails offering and sales have been small. Prices are firmer. Tees are quoted £3. 15/ @ £3. 17/6, and Old D. H.'s £4. 2/6 @ £4. 5/ c. i. f. New York.

**Serap.**—The market is quiet, with small quantities offering. Heavy Wrought is quoted £3. 12/6 @ £3. 15/ c. i. f. New York. Bessemer Crop Ends, run of the mill, are quoted 60/ f. o. b. shipping port.

**Copper.**—The market is quiet, with moderate business doing. Best Selected is quoted, nominally, £74. 10/ @ £75. 10/ and Chili Bars, £67. 5/ @ £67. 10/.

**Tin.**—The market has fully recovered and prices are firm. Transactions and demand are fair. Straits Tin, spot, is quoted £96 @ £96. 10/ and futures, £97 @ £97. 10/.

**Tin Plates.**—The demand continues to improve and prices are firm, with prospects of higher figures soon. We quote as follows:

Tin Plates, 10 x 14, 1st qual. Charcoal	21/ @ 24/
" " " " " "	19/ @ 21/
" " " " " "	18/ @ 20/
" " " " " "	17/ @ 19/

**Spelter.**—Business continues light and prices fluctuate. We quote Ordinary, £16. 15/ @ £17 at shipping port.

**Lead.**—The market is quiet, with light demand. English Common is quoted £14. 5/ @ £14. 7/6.

**Freights.**—Steam from Glasgow to New York, 12/6 @ 15/; ditto from Liverpool to New York, 10/ @ 12/6; Liverpool to Philadelphia, 11/ @ 13/6.

## FINANCIAL.

Office of The Iron Age, 1

WEDNESDAY EVENING, JUNE 28, 1882.

During the week under review the volume of local trade has been much restricted and seriously embarrassed by the strike of freight handlers, but the tone of the markets, though quiet, is generally steady. Crop prospects are more than ever hopeful, in view of the maturing harvests, giving assurances of a renewal of activity at a day not far distant, and affording a basis for substantial prosperity. Already a considerable number of ships have been chartered for grain from New York and Baltimore, prompted by indications of a returning export demand. As yet, however, buyers and sellers are too far apart in their views to permit of much increase in actual business. Reports from numerous points in Kansas, Missouri and Southern Illinois show that the wheat harvest is now in full blast. Almost without exception, the yield is heavy and of fine quality and the weather favorable. The Kentucky Bureau estimates the wheat yield in that State at 12,500,000 to 13,000,000 bushels, which is a larger crop by nearly 2,000,000 bushels than was ever raised there before. Any deficiency in the yield per acre in certain localities will be made good from the increased area under cultivation.

To-day's steamers took out \$1,400,000, of which \$850,000 was in fine bars and the remainder in coin. Bullion dealers calculate that there is at least 1/4 of 1 per cent. loss on exports at the present rate of exchange, or say \$2500 on \$1,000,000. All through the week the foreign exchange market has ruled dull and weak, prime bankers' 60 days sterling being 4.85 1/4 @ 4.85 3/4 and demand 4.88 @ 4.88 1/4.

Money has been easy at 2 1/2 @ 3 per cent. on call, except as an artificial stringency on Tuesday afternoon squeezed the rates up to 7 per cent. The advance brought out free offerings of money, and the rate quickly settled back to a nominal figure. The practical effect of the repeal of the Usury law will not be fully apparent until money becomes stringent from natural causes.

On the Stock Exchange during the week, the market has been generally strong and active. The upward turn observed a week ago, based on favorable news concerning the crops and reports of large purchases by Mr. Vanderbilt in the North-westerns and St. Pauls, received a further impulse on succeeding days. The feature was a sharp advance in Louisville and Nashville and the Vanderbilt properties, and coal stocks gained strength from rumors of an intended advance in the price of coal July 1. The improvement has been steadily maintained, and it is remarked that the trunk-line roads are rather forward than otherwise by the freight strikers' blockade, which enables them to take advantage of the advance in schedule rates July 1. To-day speculation was strong, with an increased volume of business, the Southwestern, the Vanderbilt and coal stocks being most conspicuous. The active stocks ranged as follows to-day: Kansas and Texas, 32 @ 33 1/4; Texas and Pacific, 43 1/2 @ 44 1/2; Lake Shore, 109 3/4 @ 111; Denver and Rio Grande, 54 1/2 @ 56; Louisville and Nashville, 65 1/4 @ 67 1/4; Jersey Central, 75 @ 76 1/4; Reading, 57 1/4 @ 58 1/4; Michigan Central, 88 3/4 @ 89 1/2; Delaware, Lackawanna and Western, 126 1/4 @ 127 1/2; and Wabash Preferred, 49 1/2 @ 50 1/4. Houston and Texas advanced to 75 1/2 from 71 1/2.

The interruption of freight shipments by the strike of freight handlers employed by the transportation companies has virtually placed New York city in a state of siege. A large proportion of bulky merchandise is now being transported by water in all directions, so far as practicable, notably by the Southern lines of steamers and by boats running up the Hudson river and on Long Island Sound. While perishable kinds of merchandise, dairy products especially, have suffered from the unlooked-for detention, very considerable orders for purchase have been diverted to other cities. There is a current belief, however, that at last matters have reached an extremity from which there must be speedy relief. Public sympathy inclines to the strikers rather than the railway corporations.

Respecting the diversion of trade, a Chicago telegram of to-day says: "The freight-handlers' strike at New York is diverting shipments of provisions and other property destined for Europe, to Boston and other cities where shippers are assured of a prompt delivery to vessels, but owing to the high prices, shipments are smaller than at the corresponding period in many years." Merchants representing the Board of Trade and Transportation failed in their interview with Mr. Fink, the Pool Commissioner, to arrange for a conference with the trunk lines. Their irritation was in no degree allayed by the refusal of the Erie Railway Company to receive freight unless a small printed slip, reading as follows, is first pasted upon all bills of lading: "This company receives this property only upon the express condition that it shall not be liable for delays, loss or damage thereto caused by or resulting from strikes, acts of violence, threats or intimidations." Merchants have taken steps preliminary to the employment of counsel, for the purpose of enforcing their claims against the railroad companies as common carriers, where damage results from delay.

The exports of domestic produce from this port during the past week were very moderate, the total being \$6,212,748, against \$7,535,808 for the same week last year.

In manufactured products exports continue fair, but the volume is far below what might be desired. In dry goods the export request is well maintained, some handsome orders having been placed during the week for delivery in August and October, these being the earliest dates possible in making engagements on leading descriptions, on account of pressure at the mills.

By order of the Secretary of the Treasury, the Custom House will be closed at 3 p. m. during the next two months. This change has been made in partial compliance with a petition signed generally by importers and Custom House brokers.

Government bonds for the day declined 1/8 for the 4's and extended 5's. The closing quotations were as follows:

U. S. 6's, '81, continued at 3 1/2	100 3/4
U. S. 5's, '81, continued at 3 1/2	101 3/4
U. S. 4 1/2's, '81, registered	114 3/4
U. S. 4 1/2's, '81, coupon	114 3/4
U. S. 4's, 1907 registered	110 3/4
U. S. 4's, 1907 coupon	120 3/4
U. S. Currency 1895	129
U. S. Currency 1896	130
U. S. Currency 1897	131
U. S. Currency 1898	132
U. S. Currency 1899	133

State stocks have been dull, but generally strong. To-day Tennessee 6's Mixed advanced to 55 1/4 from 55 3/4, but reacted to 55. Louisiana Consols advanced to 71 from 70.

The following is an analysis of the bank totals of this week compared with that of last week:

	June 17.	June 24.	Comparisons.
Loans	\$17,871,000	\$18,716,800	Inc. \$845,800
Specie	27,881,000	28,957,500	Inc. 1,076,500
Legal t'd's	26,905,500	26,546,400	Dec. 359,100
For reserve	84,790,400	85,504,000	Inc. 713,600
Deposits	304,612,500	304,491,000	Dec. 121,500
Reserve	1	1	
Quoted	76,153,000	76,122,750	Dec. 30,250
Surplus	8,637,400	9,381,250	Inc. 743,850
Circulation	18,502,000	18,502,800	Inc. 800

The weekly bank statement was favorable, showing a gain in total reserve of \$713,600, notwithstanding the fact that for the period covered by the statement the ordinary receipts of the Sub-Treasury exceeded its disbursements in the sum of \$1,033,802.

The importations of specie and bullion at this port during the week ending June 24th were \$46,764, consisting of \$14,406 in gold, and \$32,358 in silver, as against a total of \$24,445 for the week ending June 25th last year. The importations since the 1st of January and since the 1st of August compare as follows with the movement during the corresponding periods last year:

	Since January 1—	1881.	1882.
Gold	\$568,526	\$23,150,870	
Silver	1,342,133	1,539,158	
Total	\$1,910,659	\$24,690,028	
	Since August 1—	1881.	1882.
Gold	\$25,114,812	\$9,429,838	
Silver	2,385,308	4,010,509	
Total	\$27,500,120	\$13,440,347	

MINING STOCKS.

The following were the closing quotations for mining stocks:

	Bid.	Asked.
American Flag	4	4
Ames	21	22
Alice	4	5
Alta Mont.	58	60
Belle Isle	50	50
Bulwer	1	1-90
Butte	7 1/2	7 1/2
Bull. Dou.	12	13
Bradshaw	7	8
Calaveras	7	60
California	50	50
Climax	18	18
Consolidated Imperial	3	3
Consolidated Pacific	20	20
Consolidated Virginia	43	45
Chrysolite	3-40	3-55
Cent. Ariz.	91	92
Cherokee	30	40
Durango	12	14
Deepest	13	13
Deepest	94	94
Eureka C.	10	10
Granville	2	4
Great Eastern	4	6
Hibbard	2-40	2-40
Horn Silver	10 1/2	10 1/2
Hibbard	11	12
Hortense	16	20
Independence	30	35
Iron Silver	1-90	2-00
Leadville Con.	60	60
L. Chief	58	63
Mexican	6 1/2	6 1/2
Moose	20	30
Miner Boy	5	6
Navajo	4-00	4-00
North Stan.	30	30
S. Belle	30	30
Ort. and Mil.	34	34
Rappah'k	17	17
Robinson Con.	1-00	1-05
R. Sun	65	65
S. Nevada	6 1/2	6 1/2
Sutro	39	40
Stormont	70	75
S. Hite, new	14	18
South Pacific	11	12
St. L. and A.	12	11
St. L. and 3	32	32
Tip Top	2-00	2-50
Tuscarora	15	17
Union Con.	9 1/2	10 1/2
Unadilla	7	10

## GENERAL HARDWARE.

The strike now prevailing among the freight handlers interferes very seriously with the movement of goods from this city. The demand for General Hardware, although light, is satisfactory when the season is considered, and the outlook for fall business is very encouraging. From nearly all sections favorable accounts of the growing crops are reported, and the general belief is that the yield will be the largest in the history of this country.

The demand for Foreign Hardware is inactive, but values are firm and unchanged.

Business in the Hardware and kindred trades will be generally suspended on Monday and Tuesday next, 3d and 4th proximo. A paper to this effect is being circulated, and at the close of business to-day had obtained about 60 signatures.

The Nail trade was quiet during the week, but the tone of the market continues strong. We quote rod to 60d. \$3.40, net, per keg; for small lots an advance of 10 to 15 cents on above named price is asked.

The Silver Plated Flat Ware Association have reduced the price of Silver Plated Forks and Spoons about 5 per cent., the reduction to take effect July 1st.

We have received from the secretary of the Hollow Ware Manufacturers' Association the following report of their late meeting: "A meeting of all the manufacturers of Tinned and Enamelled Cast-Iron Hollow-ware was held on the 21st inst. at the Cataract House, Niagara Falls. A representative was present from every concern of this kind in the United States. Prices now existing were confirmed for the future."

The Cincinnati Barbed Wire Fence Co. have appointed Dodman & Burke, No. 88 Chambers street, agents for their goods in this city.

We have received the following:

PHILADELPHIA, June 26, 1882.

To the Editor of The Iron Age.—DEAR SIR: There was a meeting of the following Shovel manufacturers at the Continental Hotel to-day, and a pooling association, called the Western and Eastern Shovel Makers' Association, was formed:

M. ROWLAND & SONS, Philadelphia.  
T. ROWLAND & CO., Philadelphia.  
B. ROWLAND & CO., Philadelphia.  
J. PFEIFER & CO., Philadelphia.  
PAYNE, PETTIBONE & SON, Wyoming, Pa.  
LEHIGH MFG. CO., Bethlehem, Pa.

HUSSEY, BURNS & Co., Pittsburgh.  
HUBBARD, BAKEWELL & Co., Pittsburgh.  
H. W. MYERS & Co., LIMITED, Beaver Falls, Pa.

GROOM SHOVEL CO., St. Louis.  
Prices and terms as follows: Philadelphia and Eastern Pennsylvania makers will use "T. Rowland Son's" new list July 1, 1882, and will allow a discount of 50 per cent. off, f. o. b. at factory. Terms, 30 days.

Pittsburgh, Beaver Falls and St. Louis makers will use the standard Pittsburgh list, and will allow a discount of 20 per cent. off, f. o. b. at factory. Terms, 90 days, or 2 per cent. extra discount for cash within 30 days of date of shipment. These prices made binding for six months.

The following are the officers:  
President.—LYNFORDE ROWLAND.  
Vice-President.—THOS. BAKEWELL.  
Executive Committee.—W. D. ROWLAND, R. T. PETTIBONE, E. K. HOLTON, JOHN PFEIFER.

Secretary and Treasurer.—E. A. BARNES.

Respectfully yours,  
LYNFORDE ROWLAND, President.  
Attest, E. A. BARNES, Secretary and Treasurer.

The following manufacturers of Portable Forges met at the Tift House, Buffalo, N. Y., on the 22d inst., and formed themselves into an association, to be known as the Portable Forge Manufacturers' Association of the United States:

KEYSTONE PORTABLE FORGE CO., per O. C. TORR.

CLEVELAND STEAM GAUGE CO., per W. H. SILVERTHORN.

EMPIRE PORTABLE FORGE CO., per W. T. KELLOGG.

BUFFALO FORGE CO., per W. F. WENDT.

HOLT MFG. CO., per H. W. HOLT.

A permanent organization was effected and the following officers elected:

WARREN T. KELLOGG, President.

H. W. HOLT, Secretary.

W. F. WENDT, Treasurer.

The articles determining the object of the Association and times of future meetings were adopted, after which a general discussion followed as to the best methods of regulating and determining prices at which forges should be sold. The sentiment prevailed that the condition of labor and costs of materials incident to manufacture would necessitate an advance of prices, which are to be finally determined at the next meeting of the association.

## IRON.

**American Pig.**—The tone of the Iron market during the week was of the quiet order, and no large transactions are reported; in small lots a fair business is transpiring and values are firm and unchanged. We quote: Foundry No. 1 X, \$25; Foundry No. 2 X, \$23; Gray Forge, \$22.

**Scotch Pig.**—Although there is not much activity in foreign Iron at present, holders are firm in their views, and it would be difficult to shade the figures named below. Sales are reported of 700 tons Eglinton at \$22.75 @ \$23, and 200 tons Glengarnock at \$24.75. We quote: Eglinton, \$23; Carnbroe and Glengarnock, \$24.50 @ \$25; Gartsherrie and Langlois, \$25.50 @ \$26; and Coltness, \$26.50 @ \$27.

**Bessemer Pig.**—No transactions in Bessemer Iron are reported since our last writing. At the Iron and Metal Exchange to-day 500 tons Solway Bessemer was offered at \$24.25 (to arrive and nearly due), but, although the price was considered low, the offer met with no response.

**Rails.**—We have not heard of any new business in Rails, but as the mills are nearly all sold ahead, there is nothing pressing on the market, and consequently no weakening in values. We quote Steel at mill, \$47.50 @ \$52, according to delivery. Iron Rails are almost wholly neglected and prices nominal.

**Old Rails.**—There is little or no inquiry for Old Rails. Sales are reported of 750 tons T's on the spot at \$26. We quote: T's, \$26.50, and Double Heads, \$27.50 @ \$28.

**Wrought Scrap.**—The only transaction that has come to our notice during the week is a sale of 500 tons No. 1 for shipment at \$26.75. We quote: Prime Selected, from yard, \$29 @ \$30, and No. 1, to arrive, \$27 @ \$27.50.

**Steel Crop Ends.**—Are quoted \$23.50 @ \$24.

## METALS.

**Copper.**—Sales for the week have been restricted to some 300,000 pounds Lake Superior in a jobbing way at 18¢ @ 18 1/2¢. It is not easy to get 18¢, but if a party wants any, he has to pay 18 1/2¢. "Anchor" brand and Baltimore are worth, nominally, 17 1/2¢ @ 17 3/4¢. Nothing is said about futures. The strike of freight handlers does not propitiate activity in merchandise, nor does the warm weather and the proximity of the national holiday. A week hence these paralyzing influences may make room for a more active resumption of dealings. London came yesterday £1 lower with Chili Bars, cabling the same £67, while Best Selected is worth, as heretofore, \$73. We receive from there to-day the ensuing cablegram: "Market quiet, with moderate business doing. Best Selected, nominally, \$74. 10/ @ \$75. 10/, and Chili Bars, \$67. 5/ @ \$67. 10/." London, June 17.—According to the Board of Trade returns the total imports and exports into and from this country for the first five months of the following years were:

	1880.	1881.	1882.
Copper in ores	11,222	11,586	11,017
Copper regulus and precipitate	16,609	10,992	14,034
Bars, cake and ingots	7,682	5,803	6,938
In pyrites, estimated	48,669	38,334	36,193

**IMPORTS.**

	1880.	1881.	1882.
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English copper—wrought and unwrought, 17,895 13,287 20,788  
Foreign copper—unwrought, 6,066 4,575 4,873  
Yellow metal, 6,158 6,170 7,644

Total, 24,659 24,032 23,245

According to advices from Valparaiso, the comparative exports of fine Copper from Chili and Bolivia to all parts of the world during the first three months of the following years were:



## COAL.

An intended advance of prices in the Anthracite Coal trade July 1, announced on the part of the different companies, operates as a stimulus to buyers, so that an active business is in progress. All the companies have many orders, in some instances more orders than coal. The advance proposed is by common consent, there having been no concerted action. It is understood to equal 15 to 20 cents in most sizes, and in the Pennsylvania Coal Company it affects all descriptions except Pea and Lump. Most of the other companies are not prepared to speak in detail, especially as meetings of laborers are being held in the mining regions which have some effect on the final decision. At the collieries in the Wyoming Valley, also on the part of the Pennsylvania Coal Co., and in the Scranton region, the miners are promised an advance in wages of about 10 per cent., and the general idea appears to be to add the increased cost of production to the circular prices. About working time in the mines in July, nothing definite can be said quite yet. The stocks of coal are generally light, but full time and advancing prices may not be found desirable for any length of time. On account of important changes in the circular of the Philadelphia and Reading Coal and Iron Co., we give the following summary:

At Elizabethport, N. J.	Broken	Segs.	Store.	Chest.
Hard white ash coal	\$4.35	\$4.35	\$4.35	\$4.15
Free-burning white ash coal	4.15	4.10	4.35	4.15
North Franklin white ash coal	4.15	4.25	4.35	4.15
Schuykill red ash coal	4.15	4.45	4.15	4.15
Shamokin coal	4.15	4.45	4.15	4.15
Lorberry coal	4.15	5.00	4.15	4.15
Lykens Valley (Brookside)	5.35	5.50	5.50	4.94
Lump and Steamer, \$5.	Pea, \$2.95	\$3.15		

In the Bituminous trade business is demoralized. Cumberland is working foreign labor and getting out small quantities. Clearfield is agitated by labor troubles, of which the end is not yet apparent. Myers's semi-bituminous will be advanced to \$4.75, on board. Eastern freights are \$1.10 to Boston and 80 cents to Providence.

The Philadelphia North American says: "The companies are not producing quite up to the demand now, and the Reading has been even compelled to refuse orders within a day or two for certain sizes. Line and city is quiet, as usual at this time of year, but other departments of the trade are exceedingly busy. There is, however, no marked disposition to make any greater advance in prices than is necessary to cover the toll rise mentioned above, it being the opinion of the more conservative spirits of the trade that a material advance would not be the best policy at this time. It is better to postpone it till about September, for obvious reasons."

## OLD METALS, PAPER STOCK, &amp;c.

The purchasing prices offered by dealers are as follows:

Copper, heavy	100	\$0.15
light	100	14
Copper Bottom	100	13
Yellow Metal	100	10
Brass, heavy	100	11
light	100	10
Composition, heavy	100	15
Lead, heavy	100	10
Tea Lead	100	10
Pewter, No. 1	100	14
Wrought Iron	100	24.00
Light do.	100	13.00
Stove Plate	100	12.00
Machinery do.	100	17.00
Grade Bars	100	10.00
Electrotype plates	100	0.45
Stereotype plates	100	0.45
Small type	100	0.45

The prices current (prices paid by local dealers) for Rags, &c., are as follows:

Canvas, Linen	100	3.50
White Cotton	100	2.50
No. 2	100	2.50
White, No. 1	100	4.00
No. 2	100	3.50
Seconds	100	3.50
Soft Woollens	100	8.00
Mixed Rags	100	1.50
Gunny Bagging	100	1.50
Jute Butts	100	1.50
Kentucky Bagging	100	1.50
Book Stock	100	2.50
Newspapers	100	1.50
Waste Paper and Scraps	100	1.50
Kentucky Bale Rope	100	1.50

## FOREIGN TRADE MOVEMENTS.

The following is a summary of foreign trade movements during the past week:

Imports.	1880.	1881.	1882.
Total	\$2,218,221	\$7,837,194	\$7,158,533
Prev. reported	238,812,464	199,063,274	238,512,619
Since Jan. 1	\$248,030,685	\$206,900,468	\$245,672,122

Included in the imports were articles of merchandise valued as follows:

Quantity.	Value.
Antimony	100
Brass goods	17
Bronzes	100
Chains and anchors	100
Clocks	19
Copper	100
Cutlery	100
Guns	140
Hardware	100
Iron, pig, tons	5,850
Iron, sheet, tons	2,351
Machinery	100
R. R. bars	3,469
Iron tubes	11
Iron ore, tons	3,608
Metal goods	321
Nails	7
Needles	11
Iron, other, tons	5,499
Nickel	17
Old metal	100
Plated ware	100
Pins	47
Quicksilver	900
Saddlery	31
Steel	53,666
Spelter	77,672
Silverware	3
Tin, bxs.	100
Tin, slabs	20,402
Tin, slabs	1,534

Wire, lbs. 5 1,221  
Zinc, lbs. 111,904 4,053

The quantity of leading articles compares with previous dates as follows:

	For the week.	25 weeks.	Same time.
Cutlery, pkgs.	55	3,474	3,402
Hardware, pkgs.	3	571	582
Iron, R. R. bars	3,469	74,310	164,301
Lead, pkgs.	16,544	18,093	18,093
Steel, pkgs.	53,666	1,007,820	464,173
Tin, boxes	20,402	1,055,051	736,491
Tin slabs, lbs.	137,035	8,344,819	7,466,841

## EXPORTS OF SPECIAL.

For the week ended June 24:

Total	\$1,447,052
Previously reported	32,836,385

Total since January 1, 1882	\$14,283,437
Same time in 1881	4,620,941
Same time in 1880	4,620,941
Same time in 1879	11,154,303
Same time in 1878	8,579,482
Same time in 1877	10,501,172
Same time in 1876	36,117,152
Same time in 1875	33,944,686
Same time in 1874	28,210,509
Same time in 1873	27,372,729
Same time in 1872	30,637,044

## EXPORTS EXCLUSIVE OF SPECIAL.

For the week ended June 24:

Total	\$9,163,769
Prev. reported	\$7,538,808
Since Jan. 1	\$189,720,660

## IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending June 28, 1882:

Hardware.	1880.	1881.	1882.
Total	\$9,163,769	\$7,538,808	\$6,312,748
Prev. reported	189,720,660	178,028,601	149,409,036
Since Jan. 1	\$189,720,660	\$185,554,409	\$153,614,778

June 28, 1882:

Baldwin Bros. & Co.	3
Gun Barrels, cs.	3
Barbour Bros.	3
Machinery, pkgs.	33
Brands & Co.	3
Machinery, pkgs.	3
Brownbridge J. S.	3
Cask, 4	3
Burkshaw W. C.	3
Cases, 4	3
Baker, Hermann & Co.	3
Packages, 41	3
Coombs, Crosby & Co.	3
Revolvers, cs.	3
Calhoun, Robbins & Co.	3
Cases, 2	3
Codd Abraham	3
Machinery, cs.	1
Conklin Geo. & Co.	3
Machinery, cs.	8
Degruy, Aymar & Co.	3
Chain, lengths, 10	3
Chain, cs.	5
Mdse., cs.	12
Drexel, Morgan & Co.	3
Cases, 10	3
Field Alfred & Co.	3
Mdse., cs.	39
Guns, cs.	13
Graef Cutlery Co.	3
Cutlery, cs.	4
Godfrey Chas. J.	3
Arms, cs.	7
Harley & Graham	3
Arms, cs.	6
Mdse., cs.	6
Howard Bros. & Read	3
Cases, 4	3
Hildick A. H.	3
Mdse., cs.	3
McCoy & Sanders	3
Chains, cs.	1
Box, 1	3
Moss F. W.	3
Files, cs.	1
Moore's Sons J. P.	3
Cases, 2	3
Guns, cs.	15
Mundor & Esprilla	3
Hinges, cs.	3
Schuyler & Duane	3
Mdse., cs.	1
Schoverling, Daly & Co.	3
Gales	3
Guns, cs.	28
Von Cleft & Co.	3
Wagner W. F.	3
Bundles, 583	3
Bars, 119	3
Cases, 54	3
Windmiller & Roelker	3
Arms, cs.	4
Wiebusch, Hilger & Co.	3
Cases, 3	3
Cutlery, cs.	37
Winchester Arms Co.	3
Mdse., cs.	7
Wolff H. & Co.	3
Cases, 6	3
Witte J. G. & Bro.	3
Cutlery, cs.	14
Needles, case, 1	3
Order	3
Cases, 16	3
Machinery for Can-	3
ada, cs.	21
Guns, cs.	13
Files, cs.	3
Gun barrels, cs.	8
Machinery, pkgs.	36

Steel.

Abbott Jere & Co.	3
Bundles, 68	3
Cases, 42	3
Brown Wm.	3
Cases, 13	3
Collins H. E. & Co.	3
Blooms, 134	3
Carey & Moon	3
Wire, bds., 378	3
Cohen M.	3
Cases, 21	3
Dodge A.	3
Wire, cs., 2	3
Duval H. R.	3
Bars, 2	3
Bundles, 251	3
Plates, 88	3
Cases, 23	3
Bands, 38	3
Hensel, Bruckman & Co.	3
Bars, 89	3
Wire, 777	3
Morton, Bliss & Co.	3
Rods, pkgs., 1872	3
Rails, 1044	3
Blooms, 335	3
Moss F. W.	3
Bundles, 4	3
Bars, 35	3
Cases, 2	3
Montgomery & Co.	3
Packages, 47	3
Smith H.	3
Pearl scrap, bbls., 4	3
Temple & Lockwood	3
Cases, 188	3
The Tomlinson Spring Co.	3
Bundles, 125	3
Guns, cs.	28
Wagner W. F.	3
Bundles, 583	3
Bars, 119	3
Cases, 54	3
Windmiller & Roelker	3
Arms, cs.	4
Wiebusch, Hilger & Co.	3
Cases, 3	3
Cutlery, cs.	37
Winchester Arms Co.	3
Mdse., cs.	7
Wolff H. & Co.	3
Cases, 6	3
Witte J. G. & Bro.	3
Cutlery, cs.	14
Needles, case, 1	3
Order	3
Cases, 16	3
Machinery for Can-	3
ada, cs.	21
Guns, cs.	13
Files, cs.	3
Gun barrels, cs.	8
Machinery, pkgs.	36

Iron.

Baring Bros. & Co.	3
Nail rods, bds., 5064	3
Wire rods, cs., 274	3
Brown Bros. & Co.	3
Bars, 4174	3
Coils, 264	3
Wire rods, cs., 318	3
Brookner & Evans	3
Wire netting, bbls., 92	3
Crocker Bros.	3
Pig, tons, 32	3
Spiegel, tons, 333	3
Coddington T. B. & Co.	3
Sheet, bds., 656	3
Sheet, bxs., 69	3
Elliot, Sons & Co.	3
Ore, tons, 629	3
Ore, lot, 1	3
Hime & Holland	3
Pig, tons, 200	3
Lee James & Co.	3
Pig, tons, 100	3
Lillienberg N.	3
Bars, 240	3
Manitoba R. H. Co.	3
Mdse., cs., 182	3
Marv Wm. D.	3
Ore, tons, 730	3
Milliken & Smith	3
Wire, bds., 648	3
Wire rods, bds., 2201	3
Morton, Bliss & Co.	3
Rails, 2085	3
Angle bars, 420	3
Beams, 4	3
McFarlan Geo.	3
Wire cloth, pkgs., 5	3
Meyer G. A. & E.	3
Oxide, bbls., 45	3
Moore J. P. & Co.	3
Pig, tons, 200	3
Wallace W. H. & Co.	3
Plates, 4	3
Whitney A. R.	3
Tubes, 500	3
Williamson, J. & Co.	3
Pig, tons, 200	3
Order	3
Pig, tons, 200	3
Pig, lot	3
Old rails and pcs.	3
1750	3
Ore, tons, 203	3
Spiegel, tons, 1347	3
Spiegel, lot	3
Bars, 7484	3
Ironwork, pkgs., 76	3
Bundles, 906	3

Metals.

Bank of Montreal	3
Terrace plates, bxs., 1082	3
Bond, Parsons & Co.	3
Tin plates, bxs., 937	3
Cort N. L. & Co.	3
Tin plates, bxs., 5455	3
Dickerson, VanDusen & Co.	3
Antimony, cs., 17	3
Black tags, bxs., 450	3
Black tags, bxs., 700	3
Dodd David & Co.	3
Tin foil, cs., 1	3
Durand J.	3
Old lead, bxs., 8	3
Elwell J. W. & Co.	3
Brass, cs., 1	3
Brass, bbl., 1	3
Copper, cs., 1	3
Yellow metal, cs., 1	3
Lead, bbl., 1	3
Downing R. F. & Co.	3
Nickel alloy and copper alloy, cs., 5	3
Elwell Jas. & Co.	3
Old metal, lbs., 3790	3
Foot Emerson	3
Nickel alloy, cs., 13	3
Henderson Bros.	3
Tin slabs, 1698	3
Katz Bros.	3
Macy's Sons Josiah	3
Zinc oxide, bbls., 100	3
Moors J. B. & Co.	3
Spelter, plates, 4155	3
Nelder, C. W.	3
Brass, ingots, 21	3
Outerbridge H.	3
Copper, cs., 12	3
Phelps Dodge & Co.	3
Tin plates, bxs., 14,000	3
Order	3
Tin plates, bxs., 29,000	3
Antimony, cs., 30	3
Tin slabs, 1000	3
Tin sheets, cs., 109	3
Zinc, cs., 100	3
Plumbago, bbls., 70	3
Tin, ingots, 600	3
Tin, bbls., 5	3
Quicksilver, bottles, 300	3
Spelter, plates, 4155	3

Exports.

Ag. imp. pkgs.	18
Hdw. pkgs.	56
Mf. cop. cs.	1
Mf. iron, pkgs.	15

Exports.

Ag. imp. pkgs.	18
Hdw. pkgs.	56
Mf. cop. cs.	1
Mf. iron, pkgs.	15

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Exports.

Ag. imp. pkgs.	18
Hdw. pkgs.	56
Mf. cop. cs.	1
Mf. iron, pkgs.	15

Exports.







### The Freight Blockade.—Suits Against the Railroads.

The following circular, which explains itself, was issued this afternoon by the Special Committee on Freight Grievances, recently appointed by the Board of Trade and Transportation:

N. Y. BOARD OF TRADE AND TRANSPORTATION,  
Nos. 97 and 89 Pearl street,  
JUNE 28, 1882.

To the Merchants of New York City: The committee appointed by the Board of Trade and Transportation, after consultation with the counsel for the Board, Simon Sterne, Esq., have resolved to undertake, at their expense, the redress of grievances of all merchants who have been injured by the course of the railway corporations centering in New York, arising from their failure to receive and forward freight within the past fortnight. Blank forms can be obtained at the rooms of the Board of Trade and Transportation, Nos. 87 and 89 Pearl street, which, when filled up, setting forth the special case of each merchant, are to be returned to the Board of Trade and Transportation for action.

The committee are advised that the Attorney-General is entitled to apply for peremptory proceedings requiring the railway corporation to perform their duties as common carriers, and that actions by individuals can, with every expectation of success, be maintained for any damages sustained by merchants for the failure of the railroad corporations to convey goods; and also that the merchants who were ready and offered shipments prior to June 30 are entitled to have their goods carried at present rates, if shipments by the action of the railway companies themselves have been delayed beyond June 30.

The committee invite the co-operation of the public in the redress of a grievance which, though largely made up of individual cases of injury and damage, is one of a general and public character as well, inasmuch as the failure of the railway companies to perform their functions as common carriers has considerably diverted trade from New York City.

DARWIN R. JAMES,  
WILLIAM A. GELLATLY,  
M. SCHRECKENBERG,  
A. M. COFFIN,  
R. F. AUSTIN.

Sub-Committee of Special Committee on Freight Grievances, composed of William H. Wiley, A. B. Miller, D. D. Mangum, Lucius Hart, R. F. Austin, F. B. Thurber, E. R. Livernore, Charles S. Smith, W. B. Boorum, C. T. Reynolds, James F. Wenman, William A. Gellatly, John F. Henry, Patrick Farrelly, M. Schreckenber, W. H. Parsons, James H. Seymour, H. K. Miller, and Josiah J. White.

### The Gas Engine.

Although the steam engine still stands unrivaled as a prime mover, the various disadvantages connected with its use, especially as a domestic motor, have, during a number of years past, offered a wide field for the display of ingenuity and science in the production of motors more cleanly, more simple in construction, less dangerous, and, in short, possessing qualities which specially adapt them to meet the requirements of small establishments and which render them suitable for domestic use. The great progress made in recent years with the gas engine, from an interesting toy to a practical source of power, has attracted public attention in a marked degree, and it is for this reason that special interest is attached to a paper on "The Theory of the Gas Engine," read by Mr. Dugald Clerk, at a recent meeting of the Institution of Civil Engineers, England. Mr. Clerk said that three distinct types of gas engines had been proposed:

1. An engine drawing into the cylinder gas and air at atmospheric pressure for a portion of its stroke, cutting off communication with the outer atmosphere, and immediately after igniting the mixture, the piston being pushed forward by the pressure of the ignited gases during the remainder of the stroke, the in-stroke discharged the products of combustion.

2. An engine in which a mixture of gas and air was drawn into a pump, and was discharged by the return stroke into a reservoir in a state of compression. From the reservoir the mixture entered a cylinder, being ignited as it entered, and without rise in pressure, but simply increased in volume, and following the piston as it moved forward, the return stroke discharged the products of combustion.

3. An engine in which a mixture of gas and air was compressed, or introduced under compression, into a cylinder, or space at the end of a cylinder, and then ignited while the volume remained constant and the pressure rose. Under this pressure the piston moved forward and the return stroke discharged the exhaust.

Types 1 and 3 are explosive engines, the volume of the gases remaining constant while the pressure increases. Type 2 is a gradual combustion engine, in which the pressure is constant and the volume increases. Calculating the power to be obtained from each of these types of engines, supposing no loss of heat in the cylinder, it was found that an engine of type 1, using 100 heat units, would convert 21 units into mechanical work; in type 2, 36 units; and in type 3, 45 units. The great advantage of compression was clearly seen by the simple operation of compressing before heating, the last engine giving for the same expenditure of heat 2.1 times as much work as the first. In any gas engine compressing before ignition, igniting at constant volume and expanding to the same volume as before ignition, the possible duty,  $D$ , is determined by the atmospheric absolute temperature,  $T$ , and the absolute temperature after compression,  $T'$ , and the duty is expressed by the equation,

$D = T' - T$ , whatever might be the maximum temperature after ignition. Increasing the temperature of ignition increases the power of the engine, but does not cause the conversion of a greater proportion of heat into work. That is, the possible duty of the engine is determined solely by the amount of compression before ignition. Compression

makes it possible to obtain from heated air a great amount of work with but a small movement of piston, the smaller volume giving greater pressures and thus rendering the power developed more mechanically available. Seeing the great difference produced between types 1 and 3 by the simple difference in the cycle operation when there is no loss of heat through the sides of the cylinder, the question arises, which engine in actual practice, with the cylinder kept cold by water, will come nearest this theory? In which of the engines would there be the smaller loss of heat? Comparing the two engines, with equal movements of piston it was found that the compression-engine had the advantage of a lower average temperature and a greater amount of work done; also of less service exposed to flame, and consequently it lost less heat to the cylinder. Taking all circumstances into consideration, it was certainly not overestimating the advantage of the compression engine to say that it would, under practical conditions, give for a certain amount of heat three times the work it was possible to get from an engine using no compression.

It is interesting to calculate the amounts of gas required by the three types under the supposed conditions. Taking the amount of heat evolved by 1 cubic foot of average coal-gas as equivalent to 505,000 foot-pounds, and calculating the gas required if all the heat were converted into work, it was found to be 3.92 cubic feet per horse-power per hour. Therefore, the amounts of gas required by the three types of engine would be:

Type (1)  $\frac{3.92}{0.21} = 18.3$  c. ft. per h. p. per hr.  
Type (2)  $\frac{3.92}{0.36} = 10.9$  c. ft. per h. p. per hr.  
Type (3)  $\frac{3.92}{0.45} = 8.6$  c. ft. per h. p. per hr.

Comparing these figures with results obtained in practice from the three types of engine losing heat through the sides of the cylinder, it was ascertained that the amount of gas consumed was as follows:

Type (1) Lenoir, 95 c. ft. per ind. h. p. per hr.  
Hugon, 85 c. ft. per ind. h. p. per hr.

Type (2) Brayton, 50 c. ft. per ind. h. p. per hr.

Type (3) Otto, 20 c. ft. per ind. h. p. per hr.

It will be seen from this that the order of consumption corresponds with theory. The Otto engine converts about 18 per cent. of the heat supplied into work, while the Hugon engine converts only 3.9 per cent. Taking the loss of heat due to radiation from the cylinder walls as given by the comparison of the adiabatic line of fall of temperature with the actual line of fall shown by indicator diagrams, it appears much less than is really the case, as shown by the gas consumed by the engine. It was found that the maximum pressure produced was much less than would be expected from the amount of gas present, this being due to the limiting effect of chemical dissociation. Analyzing the disposal of 100 heat units by Clerk's gas engine, it was found to convert 17.8 into work, to discharge 29.3 with the exhaust gases, and to lose 52.9 units by radiation and conduction. St. Claire Deville had shown that water was decomposed into its constituents at a comparatively low temperature, considerable decomposition taking place at 1200° C. The cause of so near an approach to the line of theoretical fall, as was shown by the actual indicator diagram, was simply the continuous combination of the dissociate gases. At a maximum temperature of about 1600° C., complete combination of the gases with oxygen was impossible, and could only take place when the temperature fell low enough.

Mr. Clerk further stated that in calculating the efficiency of the gas engine from its diagram, all previous observers had fallen into error, since they neglected the effects of dissociation, their results consequently being much too high. Mr. Otto, in order to account for this so-called sustained pressure, had advanced the theory that inflammation was not complete when the maximum pressure was attained at the beginning of the stroke, but that by a peculiar arrangement of strata he had made it gradual, and continued the speed of the flame while the piston moved forward. Mr. Otto called it slow combustion, which designation Mr. Clerk considers erroneous, since such an action should rather be called slow inflammation. It exists in the Otto engine, but only when it is working badly, and is attended by a great loss of heat and power. Mr. Clerk arrived at the conclusion that slow inflammation was to be avoided in the gas engine, and that every effort should be made to secure complete inflammation at the beginning of the stroke. He had found it possible to ignite a whole mass in any given time, between the limits of one-tenth and one-hundredth part of a second, by arranging the plan of ignition so that some mechanical disturbance by the entering flame was permitted. A diagram taken from the Otto and Langen free-piston engine, as given in a paper by Mr. F. W. Crossley, and an analysis of his reasoning showed that the results were misinterpreted and false conclusions arrived at concerning the nature of an explosion. Mr. Crossley considered that an explosion of gas and air, pure and simple, must be accompanied by a rapid rise and almost instantaneous fall of pressure. This, he thought, was proved by the diagram, but in this statement Mr. Clerk could not concur. From the considerations here advanced it will be seen that the course of the comparative efficiency of the modern gas engine over the old Lenoir and Hugon type is to be summed up in the one word "compression." It was stated that without compression before ignition an engine could not be produced giving power economically and with small bulk. The mixture used might be diluted, air might be introduced in front of gas and air, or an elaborate system of stratification might be adopted, but without compression no good effect would be produced. In concluding, Mr. Clerk said that the gas engine was in its infancy, and that many years of work were necessary before it could rank with the steam engine in capacity for all uses. The time would come when factories, railways and ships would be driven by gas-engines as efficient as any steam-engine, and much safer and more economical of fuel. The steam-engine converted so small an amount of the heat used by it into work

that, although it was the glory and the honor of the first half of this century, it should be a standing reproach to engineers and scientists of the present time.

A new gas engine which has recently appeared in England, and is called Barker's Universal Gas Engine, is specially recommended on account of its cheapness. The engine, so far as construction is concerned, is said to be very simple, the gas being exploded by means of a jet outside the cylinder. The repeated loud explosions, however, are under many circumstances a strong objection to its adoption.

### LABOR AND WAGES.

The reported strike at the rolling mill of Everson, McCrum & Co., at Scottdale, Pa., turns out to be no strike at all, Mr. John Q. Everson, says: "The report is so far from the truth that I cannot conceive how it could be originated. The whole story might be regarded as true with but two trifling exceptions. First, there was no strike at our Scottdale mill, and secondly, there are not 600, but 65 men, concerned in what did take place; and what happened is soon told. The boss puddler refused to accept the work of two puddlers. In hot weather this is frequently the case. Iron will not pass the test of the squeezers, and in this case the metal was returned for reworking. The two men were dissatisfied and quit work. Their places were filled within an hour, as three applications were received in that time, and to-day there are eight applications from puddlers—competent men, too. There was no action on the part of the men as reported, and our mill is running as usual to-day. Further, in our Scottdale mill there are between 65 and 70 men employed. Our blast furnace and coal mines and other departments will barely foot up the total given in the extraordinary statement. As regards the Amalgamated Association, it has been the policy of the firm not to oppose the association in any way. Three years ago we obtained a victory over the association, but there has always been a kindly feeling toward that body. Only a few days ago a prominent Amalgamated man came up to our mill and approved of our position in the present disturbances."

A committee of puddlers and scrapers of the St. Louis iron mills, consisting of Messrs. Finn, McVeery and Cole, have just issued a rather remarkable address to their employers. They complain that these two classes are greatly underpaid and the difficulty cannot be remedied by any labor union. The cause of the trouble they say is the contract system. In the bar and guide mills, rolling, roughing, catching, hooking and heating are contracted for by one man, who in turn sublets the contracts to others. The finishing men have thus far succeeded in obtaining the best wages and will not lend a helping hand to the puddlers, who claim that they are earning only \$2.50 per day. The abolition of the contract system is asked for as the easiest solution of the whole trouble. The men agree that as soon as this is done wages will become equalized just as in other places.

The Primrose mines, near Pittsburgh, operated by Messrs. Robbins, Block & Co., and the Crawford, operated by Mr. Crawford, are running full time, with their former crews, at 3½ cents per bushel, and the owners do not anticipate any trouble. The miners were, however, startled this morning shortly after three o'clock, when the melodious sound of martial music awakened them from their slumbers. On investigation it was learned that a procession of 91 men from the McDonald's camp was in their midst, with a view of inducing the men to come out. Some 10 or 12 were induced to quit. The balance say they are not working for Jones, and say they will continue.

The Brier Hill mines now employ 25 colored miners and eight whites, and take out enough coal to supply the demand. They average from five to seven cars daily. Rend, at Laurel Hill, employs 100 men, mostly colored, and turns out 25 cars daily. Operators say that the colored men give good satisfaction, and load about as many cars daily as ever with the same amount of men. The living in camp consists principally of bread and coffee. The miners, however, say that they can subsist on that kind of food when not at work. The majority of the old miners agree to return to work at the operators' prices, providing the men now employed be discharged and sent away. The operators regard such action as base ingratitude, alleging that they could not consistently discharge the men who carried them through their most critical period. The rations of the men in camp seem quite meager, but the men seem cheerful and satisfied with their lot.

Charles Parrish & Co., at Wilkesbarre, Pa., have increased the wages of miners and inside workmen 10 per cent., and outside laborers to a dollar and a half a day.

Fifteen hundred men in the employ of the Joliet, Ill. Iron and Steel Rolling Mills are out of work by the shutting down of the mills on account of dull times.

The strike at Pratt's coal mines, near Birmingham, Ala., has ended, the men resuming under the old terms.

Notices signed by the general coal agent of the Delaware, Lackawanna and Western Company, announcing that on and after July 1, 1882, and until further ordered, miners and others employed inside would be paid an advance of 10 per cent., and outside laborers \$1.45 per day, has been posted up at all the company's works. The increase of 10 per cent is general, and will take effect in the Lackawanna, the Luzerne, the Lehigh and the Schuylkill Valleys.

The Amalgamated Association took us to task recently because we suggested that its members did violate agreements made. A St. Louis brother has been "talkin' out in meetin'." He says in a letter published in the Labor Tribune of last week: "Is it not strange that men who profess to be in accord with the principles of the Amalgamated Association of Iron and Steel Workers should so persistently act in open violation of one and all of those principles? Our National Lodge president, after a patient and careful investigation of the trouble in this district, declared that our ceasing work at present was at least inopportune, and furthermore demonstrated that it was a flagrant breach

of the contract governing the district, and an open revolt against the jurisdiction of the National Lodge. He counseled and officially commanded all to return to work at last year's rates. Wednesday the St. Louis Bolt and Iron Company started their mills, both employer and employee seemingly reconciled and acquiescent. Saturday we were apprized of a mass meeting of discontented held in the city of St. Louis, whereat were passed resolutions of censure upon the members of the A. A. here in general, and an especial denunciation of four or five brothers by name, couched in language unmanly and utterly unbecoming. Such a course of conduct is a great detriment to our cause, and cannot possibly emanate from men who have the cause of unionism and the welfare and final success of the A. A. of I. and S. W. at heart."

It is reported that the Clearfield miners have struck for 15 cents a ton advance. In 1873, when the old Miners' National Union, with John Siney and Zingo Park at its head, flourished, miners of this region were the most turbulent in the State. Strikes were of monthly occurrence, and the strikers at length went to such extremes that the famous conspiracy suits, in which ex-Senator Wallace was counsel for the coal operators, were instituted as a last resort. The result is known to all familiar with the history of industrial troubles in Pennsylvania. The miners' organization was broken up, and Siney and Parks, with the more prominent of their participants, were imprisoned. Since then the miners of other sections of the State have organized pretty generally, as the frequent strikes testify, but those of the Clearfield region made no effort to unite until at present the ruling price in the region is only 50 cents per ton, but although they have complained bitterly, no organized movement has been instituted to obtain higher wages. This being the case, the news that on Saturday they had in all the pits demanded an increase in the price of mining of 15 cents per ton, and when the operators refused to grant their demand immediately, had ordered a general strike to commence to-morrow, was a genuine surprise to the local labor agitators, who were not aware of the fact that for nearly three months Miles McPadden, one of the most successful Knights of Labor organizers, had been working in the district, and that all the miners have been enrolled as members of that organization. This is the case, however, and the strike is expected by the Knights of Labor to accomplish a twofold purpose—increase the wages of the Clearfield miners and at the same time end the strike in the Maryland region, which is a competitive point. When the miners of that region struck in the middle of March, they claimed that no reduction would have been offered had it not been for the fact that the price paid in the Clearfield region was so much below what they received. Their leaders did not deem it wise to attempt to get the Clearfield men to strike before they were organized, however, and although the work of organization was at once commenced, it was done so quietly that only those in the secret knew what was going on.

Considerable uneasiness is felt at Pittsburgh among glass workers over the probability of coming trouble between capital and labor in that line. A South Side manufacturer, who was questioned in reference to the matter, said: "There may be trouble in the window-glass trade at the end of the summer vacation. Last year there was some deception practiced by the window-glass blowers. When we signed the scale last year it was stated that Eastern manufacturers—that is, the factory owners of Eastern Pennsylvania, New Jersey, Maryland and Western New York—were paying 22 per cent. higher wages than Pittsburgh firms were doing. We afterward found that the Eastern firms were paying lower wages than Pittsburgh, and were also making a higher quality of glass at a cost which enabled them to fill contracts away below us. This year, in order to protect ourselves, we may refuse to sign before the scale is settled in the East. During the past year some firms have lost heavily in pots not being worked by their employees. Some means will probably be taken to remedy this evil, or at least to secure protection from it in the future. Although I hardly think there will be a strike, yet it is hard to predict a matter like that so far ahead." Isaac Cline, president of the Glass Workers' Association, thinks there will be no trouble whatever, as the inequalities between the Eastern and Western systems of rating glass will be fixed next month. He said the stocks on hand are very light, and the furnaces are so badly used up that the summer vacation will be occupied in repairing.

The action of Witherow & Gordon, of New Castle, in discharging a number of molders because they refused to sign an agreement binding them to ignore the orders of the trades unions of which they are members, has created a sensation in organized labor of the trade affected, and considerable feeling among Knights of Labor generally in this vicinity. The edict of the firm, of course, means that the employees must cease to be members of trades organizations. The Pittsburgh molders refuse to do work for Witherow & Gordon. The notice posted by the firm was as follows: "Every man now employed, or to be hereafter employed, in this shop, hereby agrees to utterly ignore any orders or obligations of any organization or union which, in any way, conflicts with our business."

**End of the Boiler Makers' Strike.**—The boiler makers' strike for an advance of 10 per cent. in wages ended on Saturday by the return of a good many of the men. At Delamater's and Roach's iron works all the men needed were taken back. The season, it was claimed, was dull, and only a limited number was required. In some cases more than the amount struck for was allowed, and in others less.

It is a significant fact that an English firm has recently completed a river steamer with a compound vertical beam engine. This vessel is intended for use in China, and is taking her place on a line of steamers the vessels of which were originally built in the United States. The steamer is, so far as we can learn, of the American model in most re-

spects, even to the details of the engine, the peculiar feature of which is that it is compound. If we remember rightly, this is the first put into a river steamer for many years.

### Blast Furnaces at Port Leyden, N. Y.

The Journal of the United States Association of Charcoal Iron Workers, gives the following interesting description of the works of the Gore Iron and Mining Company, located at Port Leyden, N. Y.: The plant consists of two blast furnaces and an extensive chemical works, wherein the acetic vapors from wood carbonization are transformed into commercial products. The two stacks, "Grace" and "Fannie," stand side by side, and are of cut stone for 33 feet, topped by iron shells for 18 feet, making the total height of the stacks 51 feet. The interior measurements of the two furnaces are similar, being as follows: Diameter of bosh, 10 feet 6 inches; height from hearth, 15 feet 3 inches; diameter of crucible, 4 feet 6 inches; height, 4 feet 3 inches; tuyeres placed 3 feet 6 inches above bottom; cubic capacity, 2550 cubic feet. The crucibles are each equipped with a water-cooled dam, Lurmann clutch notch, and four bronze tuyeres (4-inch nozzle), placed in water breasts. The stacks are lined throughout with fire-brick. The top of the furnaces, which is 7 feet diameter, is supplied with a hopper and a 4-foot bell, operated by a hand-winch. The stock house is of two stories, the ores and limestones being received upon the upper floor, in cars over the company's switch, connecting with the U. & B. R., and passed through two crushers to the floor below, on which the charcoal is also delivered. The materials are raised to the tunnel-head by a single cage hoist. The plant is located on the bank of the Black River, the water at this point dashing over a series of cascades, which, in 500 feet, make a fall of 50 feet. Only a small portion of the water power is, however, used by the company. The blowing machinery consists of two vertical iron cylinders, 60-inch diameter by 68-inch stroke, connected with two turbine wheels, under 17 feet head. An additional turbine furnishes power for crushers, hoist, wood-sawing, &c. The blast is heated in two standing pipe hot-blast stoves, each containing 24 pipes 10 feet high. There are three additional stoves of similar size, not now in use, connected with the plant. The average temperature of the blast is 800°; pressure, 1½ to 2 pounds. The practice is to blow the furnace by volume, and not by pressure. The iron is tapped every eight hours, and the average product is 23 tons per day of iron showing very satisfactory chill tests. Its composition is shown by the following analysis of No. 3 charcoal pig iron, made by Prof. Albert H. Chester, Ph. D., August 17, 1881:

Per cent.	Per cent.
Graphite..... 2.07	Phosphorus..... 0.24
Combined carbon..... 1.09	Iron..... 94.07
Silicon..... 1.67	
Sulphur..... 0.14	Total..... 99.28

A partial analysis of No. 2 and No. 4 charcoal pig iron, made by Messrs. Booth, Garrett and Blair, of Philadelphia, gave the following results:

No. 2.	No. 4.
Silicon..... 2.538	2.237
Phosphorus..... 0.247	0.258
Sulphur..... 0.034	0.028
Carbon..... 3.559	3.227

Specular ores, from Northern New York, averaging 45 per cent. of iron, are used, and are charged with 20 per cent. of local limestone, all being finely crushed. The basis of the charge are 600 pounds of charcoal (30 bushels). The average consumption of fuel is 2400 pounds of charcoal per gross ton of iron made. There is a large deposit of titaniferous ore close to the furnaces which is not used. The pyroligneous acid resulting from the condensation of acetic vapors driven out of the wood in the retorts is stored in large tanks, from which it is drawn off into stills, where the acetic acid, methyl alcohol and tar are separated. Being located convenient to the well-timbered district of the Adirondack Mountain region, the Port Leyden Works have facilities for obtaining a permanent supply of fuel. The wood used is principally maple, beech and birch, and the charcoal is made in meilers, kilns and retorts, and seven 45-cord beehive kilns are connected with the plant—one at the furnace, and six seven miles distant. The manufacture of charcoal is under the charge of an efficient superintendent who has succeeded in getting some very creditable work from meilers, the following results being given as examples: From 2500 cords of wood, 85,994 bushels of charcoal were obtained—an average of 36 bushels per cord; from 583 cords, 19,254 bushels—about 33½ bushels per cord; from 480 cords, 17,319 bushels, or on average 36 bushels per cord of wood.

### A Glass-Maker's Meeting.

LONG BRANCH, N. J., June 27, 1882. The annual meeting of the Eastern and Western Flint and Lime Glass Manufacturers' Association was largely attended. The annual banquet was held last night, and the association adjourned this morning. It was decided to have the glass industry and its interests placed in a proper light before the Congressional Tariff Commission. Charles Brockunier, of Wheeling, West Va., was elected president of the association; W. L. Libby, of Boston, vice-president, and F. S. Shirley, of New Bedford, Mass., secretary and treasurer for the ensuing year.

**Bicycle Litigation.**—The suit of the Pope Manufacturing Co., Boston, vs. McKee & Harrington, New York, came up for hearing before Judge Wallace, at Syracuse, on June 26, on a motion of the defendants to dissolve the injunction by which they have been restrained for nearly two years from making and selling bicycles in infringement of the Lallemant patent, and also on proceedings brought by the plaintiffs to have the defendants adjudged in contempt in selling simultaneous movement bicycles, so-called. Both motions were decided in favor of the Pope Manufacturing Co., and a fine was imposed on the defendants for their violation of the injunction.



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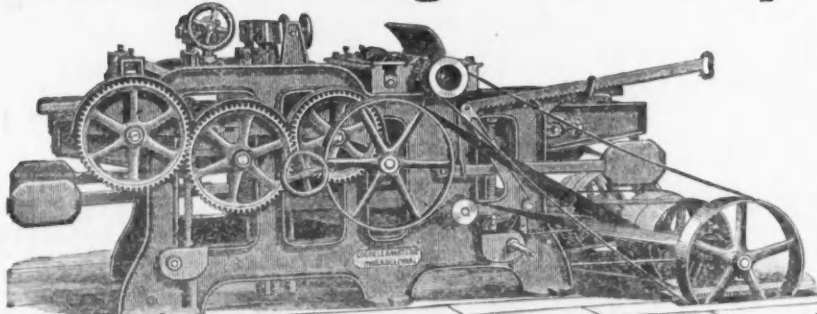
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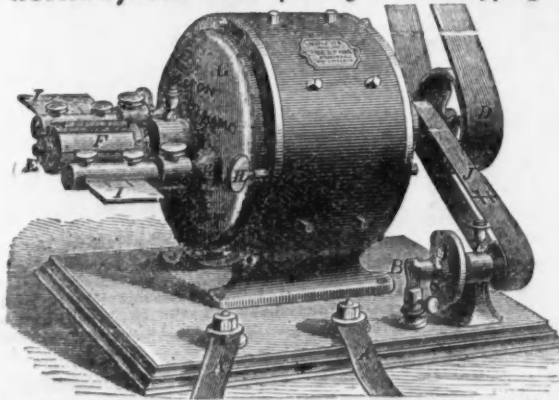
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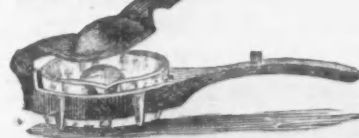
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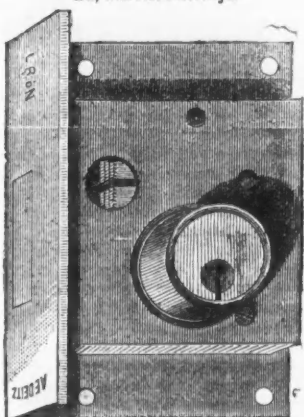
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FIRE AND BURGLAR PROOF. ALSO IMPROVED

ROLLING WOOD SHUTTERS,

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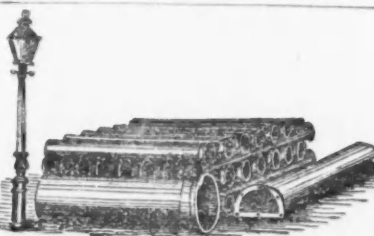
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The best Cider and Wine  
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WHITMAN AGRICULTURAL CO.,  
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Genuine and Mechanics

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Screw Wrenches

MANUFACTURED BY

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ESTABLISHED IN 1839.



Our Genuine Wrenches are made with  
straight bars, full width and enlarged jaw, hav-  
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improvements, in combination with our new  
ferrule, made with double bearings, an iron  
tube, fitted to the shank and resting against  
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PENNSYLVANIA LAWN MOWER

Outstrips All Competitors. Premiums Taken Over  
All Other Mowers.

Every Machine Warranted to Work  
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ALSO MANUFACTURE THE

Best 10-Inch Forward Cut Lawn Mower in the  
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CULTER, HOLDREGE & CO., Peoria, Ill.

DUCHARME, FLETCHER & CO., Detroit, Mich.

LOCKWOOD, VANDERBORN & TAYLOR, Cleveland.

ANDERSON HARDWARE CO., Indianapolis, Ind.

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ELECTRIC LAMPS,

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PLATES FOR BATTERIES

We make a superior carbon for electric lamps; straight, burning with a clear  
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PHILADELPHIA SCREW CO., Limited,

Twelfth and Buttonwood Streets, PHILADELPHIA.

Manufacturers of

IRON & BRASS WOOD SCREWS.

Quality, finish and tests as to strength guaranteed equal to any  
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With improved facilities and largely increased capacity for  
production, we can fill orders promptly, and invite inquiries for  
discounts. A full line in stock.

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New Haven Conn.

BLAKE'S

Challenge Rock Breakers.

Patented Nov. 13, 1879.

See The Iron Age first issue of the  
month.



WILCOX & HOWE, Birmingham, Ct.,  
Carriage Hardware.

(See The Iron Age first issue of each month.)



## INDUSTRIAL ITEMS.

## NEW HAMPSHIRE.

The Concord Axle Company have just commenced another enlargement of their works at Fisherville by adding more room to their steam hammer and forging shops and by removing their office from the main building, thus giving more room for machinery and power, and building an office directly opposite. The Axle Company is as prosperous as of old, and is in receipt of orders from all parts of the country.

## MASSACHUSETTS.

At Millbury, Mr. R. T. Buck, proprietor of the Rivelin Chisel Works, is putting in a new 30-inch iron turbine wheel of 55-horse-power capacity from the Rodney Hunt Manufacturing Company, of Orange.

The foundation to the addition of the Morse Twist Drill Works, at New Bedford, is finished and bricklaying commenced.

The armory at Springfield requires a large amount of raw material. A good idea of it can be formed from the advertisement for bids for supplies to carry on the business of the fiscal year, beginning July 1. Some of the materials advertised for are 275,000 pounds of steel, 230,000 pounds of gun steel, 30,000 pounds of iron castings, 4,000 pounds of musket powder, 21,000 pounds of cotton waste, 5,200 pounds of nails, 17,000 pounds of wire, 2,600 feet of leather belting, 140,000 feet of boards and planks, 1300 tons of coal for armory and 700 for the water shops, 30,000 bushels of charcoal, 4750 pounds of emery, 25 barrels of soft soap, 10,000 pounds of sulphuric acid, 100 gallons of alcohol, 5,000 pounds of sal soda, 170,000 pounds of ground bone, 2,000 pounds of glue, 1000 pounds of white lead, &c.—*Boston Commercial Bulletin.*

Brookton now has an industry which has long been needed, and that is a foundry for smaller first-quality castings. The Campello Foundry Company have just commenced operations in their new buildings, just east of the Campello station. Their main building is 38 x 30 feet, two stories in height. The molding room is 45 x 50 feet, and is large enough for 10 molders to work conveniently. They are prepared to make all the finer grades of castings under 700 pounds, and will make a specialty of sinks, spiders, grates and a new range of their own invention. They intend soon to erect large sheds for storage and extend their main building by an addition 30 feet square.

## NEW YORK.

The Johnson Harvester Works at Brockport were burned last week. The loss is estimated at 500,000, and 450 men are thrown out of employment. One man is supposed to have perished in the building. The fire is ascribed to incendiaries.

Mr. Gram Curtis, for more than nine years assistant to the late A. L. Holley, and still having access to his valuable collection of drawings, covering the most recent improvements in iron and steel machinery and plant, announces that he will continue the business of mechanical engineer and designer at No. 35 Broadway, New York. His attention will be given especially to Bessemer and open-hearth plants and rolling mills.

## PENNSYLVANIA.

A 3-ton hammer that was put in the Reading Railroad Co.'s steam forge at Bingham street, nearly 50 years ago, has just been removed, and a new perpendicular steam hammer, capable of striking a blow of about 4000 pounds, is being put in its place. The anvil, weighing 12 tons, has been put in position on a massive foundation. The white oak wood constituting the foundation for the old anvil was perfectly sound at the lower end, while it had considerable decay near the surface where it was exposed to the water. John N. Snyder, the foreman of the forge, was one of the first employees of the railroad company in this city.—*Reading Eagle.*

At a meeting of the subscribers to the hardware manufactory at Allentown, last week, it was decided to erect the necessary buildings. The dimensions of the foundry are to be 50 by 120 feet. Main building 2 stories high, 35 by 80 feet; \$22,400 has been subscribed.

There are now employed in the Baldwin Locomotive Works 3000 men, with a sufficient number of orders to keep them busy during the entire year. Locomotives are being turned out by the firm at the rate of 600 a year.

The large rail mill of the Pennsylvania Steel Co., at Steelton, near Harrisburg, recently made 1872 rails in 24 hours, averaging 47 seconds for each rail. This was done in 124 heats, aggregating 468 tons of metal.

Furnace No. 1, of the Allentown Iron Co., was blown in recently, all the repairs having been completed.

The Parker Glass Co., Parker City, Armstrong Co., offer for sale or rent their works, consisting of one 10-pot furnace, together with the usual appurtenances of a glass factory. They have hitherto manufactured prescription ware, bottles and flasks.

## PITTSBURGH AND VICINITY.

The managers of the Bessemer steel works at Homestead report that their experiment of not running on Sunday is a success.

Edgar Thomson Furnace A is almost ready to blow in after relining.

Evans & Co., glass manufacturers, have stopped work and are making repairs. They will probably reopen with two 10-pot furnaces, instead of one, as hitherto.

The first carload of sheet iron made by the non-union men at the Apollo Mill of Laufman & Co., was shipped on Saturday. The firm are very much gratified at the success of their experiment of working as a non-union mill, and do not anticipate any trouble beyond that of breaking in new men.

Laughlins & Co. have shut down their Eliza furnaces, and it is stated that Moorhead, McCleane & Co. will blow out their furnace shortly.

The window glass factory of Phillips Bros., on the South Side, was destroyed by fire on June 21. The fire was caused by the roof falling in on the furnace. The loss is estimated at \$12,000, on which there is about \$6000 insurance.

## OHIO.

The Dayton Screw Works, which have been standing for several years, have been placed in complete running order by a newly organized company, who have added new and most approved machinery. The works have just gone into full operation.

A manufactory has been put in operation in Cincinnati by Mr. Wm. French, for many years a leading mechanic for the National Watch Company, Elgin, Ill. His works are equipped with a very fine set of tools and machinery. He manufactures all kinds of patent articles, delicate instruments, watch machinery, dies, and special tools for fine work.

The Martin's Ferry Stove Company, with a capital of \$10,000, with privilege of increasing the same to \$100,000, have taken out a charter in West Virginia, and have let the contracts for their different buildings. The company are building a new factory to fully double their present capacity.

During the month of May the Railroad Speed Recorder Company, Kent, shipped 72 machines and printed over 1000 pounds of charts. They have ordered five tons of chart paper, which is expected to arrive soon. The machines at once become permanent fixtures wherever introduced.

Buchel, Gibbs & Co., Canton, manufacturers of plows, have one of the largest establishments of the kind in the State. The main building is of brick, three stories, and covers an area of 46 x 120 feet. The foundry building is 70 x 100 feet; grinding room, 28 x 60 feet, with a wing 20 x 29 feet; the blacksmith shop is 20 x 45 feet. It is equipped with all the necessary machinery, tools and appliances in the various departments. Seventy-five hands are employed.

Elbel, Gilliam & Co., at Canton, are doing a large business in wagon, carriage and saddlery hardware, but are keeping up to their orders.

The new rake and pick factory of Heaton & Grayson, at Martin's Ferry, is about finished and ready for operations.

The Mansfield Machine Works Co., Mansfield, commenced business with a capital of \$50,000, which, in 1867, was increased to \$100,000, and in 1871 to 300,000. The main building is a three-story brick, 40 x 360 feet, and the various buildings, including machine shop, foundry, wood-working department, paint shop and warerooms, occupy over four acres of ground. In the machine shop the mechanical equipments in every respect are as complete as capital can provide or ingenuity devise. They manufacture steam boilers, farm engines, portable and stationary engines, large power, double and single circular saw mills, pony circular saw mills with patent tooth saws, pulleys, shafting, gearing and mill machinery. The products of these works amount to over \$500,000 per annum.

Sixty-three Buckeye binders were lately shipped to Buenos Ayres from the Akron Works.

## INDIANA.

The Phoenix Foundry and Machine Company, of Terre Haute, are about to go very extensively into the flouring mill machinery business, not however to the exclusion of their usual general machinery trade.

## ILLINOIS.

The Vulcan Iron Works Co., of Chicago, are busily engaged upon their specialties of pile drivers and dredging machines, and are running full time and force. They have just finished the fifth pile driver for the Atchison, Topeka and Santa Fe Railroad.

Furst & Bradley, of the Garden City Plow Works Co., Chicago, are having an average trade in plows, cultivators and sulky rakes. They expect to shut down their works for repairs the 1st of July, so that they may be in readiness for the fall trade, the indications for which are promising.

The Roseville Mfg. Co. have purchased the plow works at Bushnell, including grounds, building and machinery, for \$15,000, and will set the machinery in motion. These works have been closed for two years.

The Kelly Steel Barb Wire Co., of Chicago, are putting in new machinery, in order to enable them to keep up closer with their orders, which are rapidly accumulating. This company find difficulty in procuring plain wire, owing to the strike, but when they can obtain it readily they run their works day and night.

E. W. Blatchford & Co., of Chicago, manufacturers of lead pipe, sheet lead, zinc, &c., are running full time, and report their business fairly active. As is their custom at this season of the year, they will soon shut down a portion of their works for repairs.

## MISSOURI.

The enlargement of the Harrison Wire Co.'s works now includes also a wire rope department. This rope is made by machinery constructed in their own shops from designs of J. B. Stow, C. E., formerly of St. Louis, who remains with them in charge of this department and as consulting engineer. They are now prepared to furnish anything on their list, and from their facilities for manufacture and established reputation, will doubtless soon secure a commanding position in the Western market.

## TENNESSEE.

The Chattanooga Stove Company has recently been organized. The stock subscriptions to date amount to \$30,000, the company reserving the right to increase the amount of capital stock as occasion demands. The company hope to be in operation by September. They have secured Mr. W. W. Baldwin, the general manager of the Cleveland Co-operative Stove Company, as general manager of their works.

## MICHIGAN.

The following table exhibits, in gross tons, the total lake shipments of iron ore from upper peninsula ports the present season, up to and including June 14, together with the amount shipped during a corresponding period last year:

Name of port.	1881.	1882.
Escanaba	260,549	436,365
Marquette	101,673	254,139
L'Anse	8,391	12,756
St. Ignace	—	5,359
Total	370,613	708,619

Showing an increase of 338,006 tons.—*Marquette Mining Journal.*

## Freight Interruptions.

Most of our transportation companies who have a terminus in New York or Jersey City have been captured by the striking freight handlers. Moral coercion is substituted for violence, in which the strikers evince their sense, for a display of numbers of orderly and well-dressed men appears to have been far more effective than the riotous mobs of former days. Not only have they induced the "green hands" to join their ranks, but to a considerable extent they have won to their cause the sympathies of the mercantile classes. This last phase of the case has been developed in part through the coincidence, altogether accidental, afforded by the "strike" of the railroads against the public, to take effect in an advance of freights on July 1st, as we have already announced. The New York Board of Trade and Transportation, for instance, in a report presented last Saturday, says: "If it were necessary for the railroads to advance their rates in order that their employees may receive a reasonable advance in wages, public opinion would sustain them to that extent, but to determine upon an excessive advance in freight rates, and then refuse the reasonable demands of laboring men, is an inconsistency which the public judgment is not likely to sustain." One of our large shipping firms estimates the losses suffered by the business men of this city at \$150,000 to \$200,000 a day, through the interruption of traffic, or, say, \$1,250,000 since the strike began, making allowance for the diversion of trade to other cities. The action of the railroad corporations appears to have been exceedingly ill-timed, if not unjust and impolitic, and if the strikers obtain the upper hand of their struggle for an advance of three cents per hour, or 30 cents a day, the result will be largely due to the arbitrary advance of the schedule rates of freight between the West and the seaboard, from 33 to 50 per cent, or, say, about \$2.40 per ton. Between the two hostile influences at work during the last 10 days the mercantile classes have suffered as rarely before.

The proposition has been made in England, by the President of the Society of Telegraph Engineers, to the effect that the Society take steps to found a college for teaching electrical science. The recent advances in the application of electricity to daily life have created a clear demand for an institution where electrical engineers can be properly taught the theory and practice of their profession. At present there is no such training school worthy of the name. So long as the electric telegraph was the only field for electrical engineers there was little need of one, for electricians were a very small body, and such as were required to go abroad on cable laying expeditions or to the foreign stations of submarine telegraph companies, could all be drafted without much trouble from the laboratories of the universities and the testing rooms of cable manufacturers. Times, however, have changed. The introduction of the telephone, the electric light and the transmission of motive power by electricity, not to mention a thousand miscellaneous adaptations of the current, have rendered it necessary to have an efficient training college for electricians. Electricity, above all other physical forces, is a thing which ought not to be dealt with by the unskilled. Accordingly, the proposition of Colonel Webster is one of considerable importance and deserves to be well considered. Electrical interests in America are not at all behind those of England, and what is important for English engineers is of equal importance in this country. We look to the early future for some steps to be taken in a similar direction here.

Much interest is being manifested at the present time in the subject of tidal mills or tidal motors. Some years ago this was a favorite theme with inventors, and a vast number of patents are on record the object of which is to utilize the rise and fall of the tides. On the Eastern coast, where the average rise and fall varies from 15 to 24 or 25 feet, the subject is one which is certainly worth considering. Many inventors, however, seem to think that the tide mills are available anywhere. This is not the case. They are practical only where a large bay is connected with tide-water by a narrow opening. At such points dams may be erected and turbine wheels driven with economy. On the coast of Maine such sites are numerous, but owing to the fact that good water-power is also available, they are hardly worth utilizing. In locations where the tide rises and falls less than 14 feet the cost of tide mills is so great as to make their competition with steam-power practically out of the question. It has been gravely proposed by inventors here in New York to use huge floats rising and falling with the tide, raising weights or compressing air. The utter absurdity of this is easily seen when we state that a float of 3000 tons displacement, or about the size of one of our larger Atlantic steamers, would develop during one day about one horse-power.

The motion transmitted by a pinion, whether it be the driver or the driven wheel, is frequently unsteady, on account of the fact that only one tooth is in action for the time being. The distance between the shafts or the required velocity ratio will often not permit the use of any other than a small pinion, and in order, therefore, to overcome the difficulty above mentioned, the pinion may be made "stepped." A "stepped" pinion consists really of two pinions side by side, the teeth in one being just midway those in the other, the wheel gearing with it being arranged in the same way. This method is said to do away with all difficulties, insuring perfect regularity of action and greater durability.

A Parliamentary paper just issued shows that the total quantity of coal, cinders and patent fuel exported from the United Kingdom in 1881 was 19,587,063 tons, of the declared value of £8,785,950. At Cardiff there were shipped 5,647,847 tons, value, £2,791,049; at Newcastle, 4,467,672 tons, value, £1,810,682; at Sunderland, 1,209,029 tons, value, £469,233; and at Newport, 1,153,227 tons, value, £559,926. The quantity shipped at no other port reached a million tons.

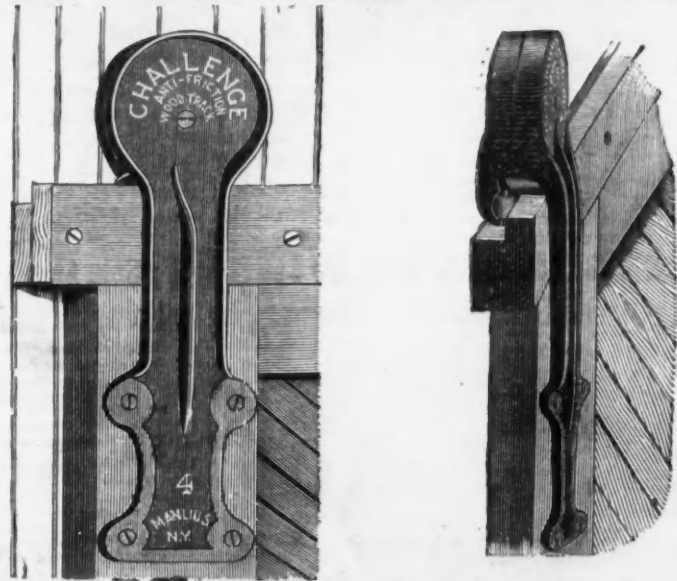
## FROM THE

## London Iron Trade Exchange,

SATURDAY, MAY 20, 1882.

"We have received from Messrs. Merchant & Co., of Philadelphia, a well-known house in the tin plate and metal trades, a copy of a list of makers' brands of tin plates which they have just issued for the guidance of buyers. The brands are alphabetically arranged under the heads of "charcoal" and "coke," and all private brands and those supplied by makers to one customer only, have been carefully excluded. The result is that the list contains only those brands whose makers are known, so that any defect in quality or packing can be traced to the proper works, and the brand would naturally be avoided in future. Mr. Clarke Merchant was over here a few months since, and devoted much time to the compilation of the information contained in the list which has now been issued by his firm. Knowing what an outcry there has been in the States against the private brand system, we feel sure the outcome of Mr. Merchant's visit will be much appreciated by buyers of tin plates in America."

## THE IMPROVED CHALLENGE ANTI-FRICTION WOOD TRACK BARN DOOR HANGER.



Patented October 6th, 1874, October 26th, 1875, and January 17th, 1882.

No Hanger has ever been introduced that combines so many good qualities as does this. It is the most perfect Anti Friction Hanger ever invented. It is heavy, strong and durable. Is easily put up and has no side friction, and it is impossible for the door to be thrown off the track. It is admired by all who see it, and is the best selling Hanger in the market. Send for circular and price list. Address

E. U. SCOVILLE, Patentee and Sole Manufacturer, MANLIUS, N. Y.,

Or FELIX D. BERTHET, Sole Agent, 82 Chambers St., New York.

## BROWN'S ADJUSTABLE PIPE TONGS.

Made from  
best se-  
lected  
Iron.



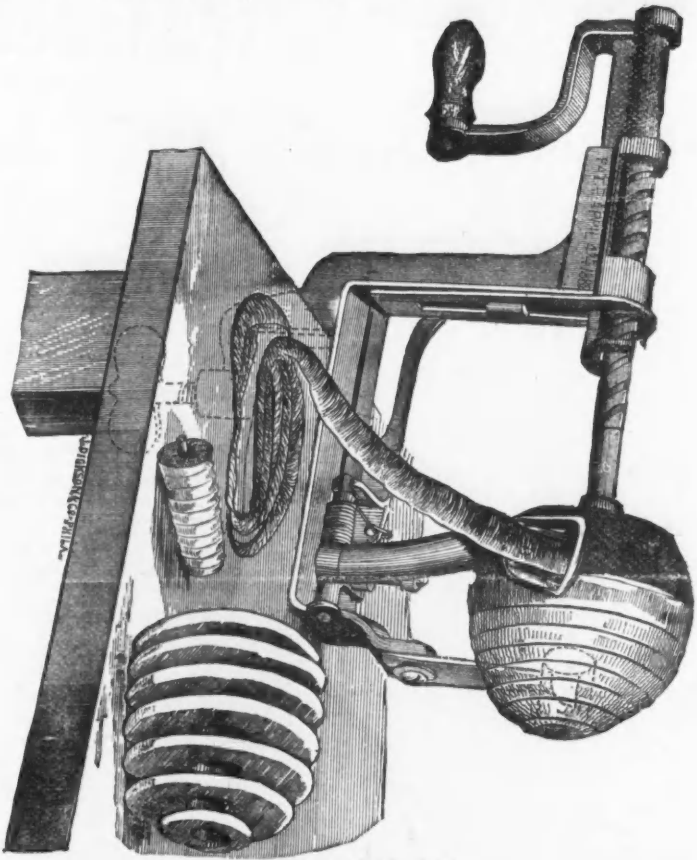
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Our capacity also, Cretinges, Finials and Vases, Stable Fixtures, Hatching Tools, and Window Guards Wrought-Iron Gratings, Fire Escapes and Ladders, Jails, &c. Our Fencing can be shipped to any part of the United States, and can be set up by the purchaser at small expense. Our prices are reasonable. Correspondence and notice of public listings of ironwork solicited. Every Hardware Dealer should have our Catalogue. Address  
CLEVELAND WROUGHT IRON FENCE WORKS  
Office, 21 Water Street, near Union Depot, CLEVELAND, OHIO.



**PENN HARDWARE CO.'S "IMPROVED PENN" 1882  
APPLE PARER, CORER AND SLICER.**



Patented April 4th, 1882.

**Far Ahead of Any Apple Paring Machine now Made.**  
You can with ONE HAND pare, core and slice an Apple and withdraw the Fork from the core all ready for another Apple. This is what no other MACHINE will do. Requires but one hand to work it.  
Does the work quicker and better than any other Machine.

MANUFACTURED BY THE  
**PENN HARDWARE COMPANY, READING, PA.**

**CHAPLIN'S PATENT**

TRY SQUARE AND MITRE. SPIRIT LEVEL AND PLUMB.

**Center Square and Draughtsman's T Square.**  
A TOOL NEEDED BY EVERY WORKMAN.

Having an **ADJUSTABLE BLADE OR TONGUE** it supplies the place of an  
**ENTIRE SET OF COMMON TRY SQUARES**  
At a small fraction of their cost, and can be used for an almost endless variety of purposes. Send for Price List.

**STANDARD TOOL CO.,**  
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SOLE MANUFACTURERS AND OWNERS OF THE PATENT.



**E. C. ATKINS & CO.,**  
INDIANAPOLIS, IND.,  
Sole Manufacturers of the  
**Celebrated SILVER STEEL DIAMOND Cross-Cut Saws**  
These fine Saws have the well-deserved reputation of being the best in use.  
The accompanying engraving is a fac simile of our Trade Mark etched on every genuine "Silver Steel Diamond Saw."  
We also make the same style of Saw of best Cast Steel, as well as all the popular patterns of Cross-Cut Saws.  
206 to 216 SOUTH ILLINOIS STREET.

**SABIN MFG. CO.,**  
MONTPELIER, VT., MANUFACTURERS OF  
**DOUBLE-ACTING SPRING BUTTS,**  
**SABIN'S LEVER DOOR SPRINGS, For heavy doors,**  
**BOSS AND CROWN SPRINGS, For light doors.**  
Send for Catalogue.

**Patented Articles of Malleable Iron.**

Hammer's Malleable Iron Oilers.  
Three Sizes. Nos. 1, 2 & 3.



No. 1.

Hammer's Adjustable Clamps.  
Hammer's Mall. Iron Hand Lamps.  
Hammer's M. I. Hanging Lamps.  
**NEW** pattern Heavy Screw Clamps; strongest in the market.  
For sale by all the principal Hardware Dealers.  
Send for Price List.

**Malleable Iron Castings**  
of superior quality, and Hardware Specialties in Malleable Iron made to order.

**HAMMER & CO.,**  
BRANFORD, CONN.

**THE HOLLY HOSE REEL,**

FOR SALE EXCLUSIVELY BY  
**C. W. KIMBALL & CO.,**



BELTING,  
HOSE, &c.,  
And mfrs. of  
Rawhide Lace,  
138 Lake St.,  
CHICAGO.

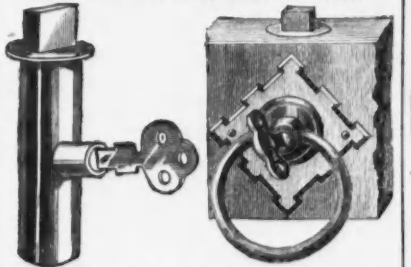
CHEAP,  
DURABLE,  
AND SIMPLE.

No. 1 carries 100  
feet 3/4 Hose.  
No. 2 carries 150  
feet 3/4 Hose.

Send for Prices.



**THE STODDARD LOCK CO.,**  
104 Reade St., New York.



Cylinder Lock. Section showing Drawer Pull and Lock Combined.  
The only Cylinder Tumbler Locks made. No screws or nails required in applying. Extra long throw of bolt. Elegant finish, and great security. Our **Keyhole Drawer Pull** is the latest novelty out. Inclose business card for price list. For sale by the jobbing trade.



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Manufacturer of  
Sprout's Double and Single Shear  
**Horse Hay Forks**  
And  
Sprout's  
HAY ELEVATORS,  
PULLEYS and GRAPPLES.  
Send for Circulars.  
Muncy, Locomotive Co. N.Y.  
ALL KINDS OF

**Gray Iron Castings**

FINE QUALITY AND FINISH.  
**JOHN KEPPELMAN,**  
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**THOMAS PARKES,**  
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**MACHINE BOLTS, NUTS AND RIVETS**  
Of All Kinds.  
Office and Works.

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**THE "EDDY" STRAIGHTWAY VALVES.**

ALSO,  
**FIRE HYDRANTS.**  
Axe, Hatchet, Powder and Brush Machinery.  
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WATERFORD, N. Y.  
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**WILEY & RUSSELL MFG. CO.,**  
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**Lightning Screw-Cutting Machinery and Tools.**

Celebrated Lightning Screw Plates.  
Lightning Bolt Cutters, both for Hand and Power, in great variety.

Taps and Dies for use in Machines, Screw Plates, Bit Brace, Drilling Machines, &c.

Green River Tire Upstatters,  
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Green River Drills,

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Bit Brace Reamers, and other Labor-Saving Tools, for Blacksmiths and Carriage Makers.



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Full set of No. 6 with 14 sizes taps and dies, making perfect screws at a single cut, tap wrench, bit brace holder and holder for lathe use. Price, \$20.

**NEW LINE.**

**WITH SHELL EJECTOR**  
30, 32, 38 and 44 Cal.  
**Pocket, Police, Navy and Army Sizes.**  
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Rifles, Cartridges, Shells, Bullets,  
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**E. REMINGTON & SONS,**  
233 Broadway. NEW YORK.

**The Humane Calf Weaner**

**The Perfect Hog Ring and Stock Mark.**  
One instrument does for both purposes. The only Ring that increases the joint outside and makes a lock joint. The Humane Calf Weaner is as easy on a calf's head as a halter and as sure to stay. Samples and descriptive circulars furnished.  
**J. H. BROWN & CO.,** Mrs. Hardware Specialties,  
OTTAWA, ILL.

**THE "RAPID TRANSIT" TRAP**

Has no superior, and is a sure and certain catcher of Mice. With the Metal Platform resting on wood bottom of Trap, an invitation is always extended to Mice of whatever "kind, color or condition of race," into secure and grated quarters, from which they are released by opening cover of Trap and depositing contents into a pail of water.  
The Mice go in at a rapid rate, and each one sets it for his mate.  
Patented August 27, 1878.  
MANUFACTURED BY  
**THE SMITH & EGGE MANUFACTURING CO.,** Bridgeport, Conn.  
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Manufacturers of  
**TOOL CHESTS OF ALL SIZES.**  
Adapted for the use of Boys, Youths, Gentlemen, Farmers, Planters, Carpenters, Railroads and Mines; fitted up complete with a superior quality of Tools, and suited to the wants of the Hardware, Toy, Station and Variety trades. Export trade solicited, and a full stock of large-sized Chests always on hand. Quality considered, we think our goods will be admitted by buyers the cheapest that have yet been offered by any manufacturer in the United States or Europe. Illustrated descriptive catalogue furnished free on application with prices.  
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Warehouse and Salesroom, 116 Chambers St., New York, U. S. A.  
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**PATENT VISE.**

The most durable, and the only solid quick-working Vise, with automatic taper jaw attachment.  
Will very soon pay for itself, in saving of time and labor.  
For sale by the trade.  
OFFICE:  
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**GOODELL'S WHITE MOUNTAIN POTATO PARER.**

Patented June 14, 1881.  
The White Mountain Potato Parer is the only machine ever made that will not only pare a potato much better than it can be done by hand, taking off a thinner paring from every shape or kind of potato, but will go into and clean out the eyes, and altogether at a saving of at least 50 per cent. It is free from the objections made to the old style of rattletrap, geared parers; is solid and substantial, cannot get out of order, and so cheap as to be within the means of everybody.  
Almost any of the Potato Parers in the market seem as if they might do the work better "next time," but the "White Mountain" DOES IT NOW. Every Machine warranted as represented.  
Price to the Trade, \$7.50 per dozen.  
**GOODELL CO.,** Antrim, N. H., Sole Manuf'rs.

**COMMON SENSE BELT STUD.**

Patented Aug. 31, 1880.  
They run smoother than lace, wear longer, cost less, and can be used over and over again. They never tear out or crack the belt. There is no clinching down the ends to be in the way and to break off. Are simple, compact, durable and easily put into and removed from the belt.  
Give them a trial. Price \$2 per box of 100.  
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Three Grades,

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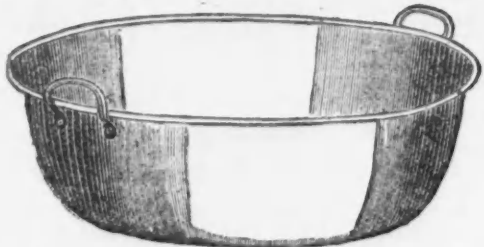
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We desire to call special attention to our line of Nickel Plated Nut Picks, Nut Crackers and Fruit Knives.

They are fine in appearance, durable and very cheap. They are put up in sets in handsome imitation Morocco boxes, or any of the articles alone in common boxes.

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**SHULTZ BELTING COMP'Y,**  
MANUFACTURERS OF

Shultz Patent Fuled Leather Belting and Lace Leather.

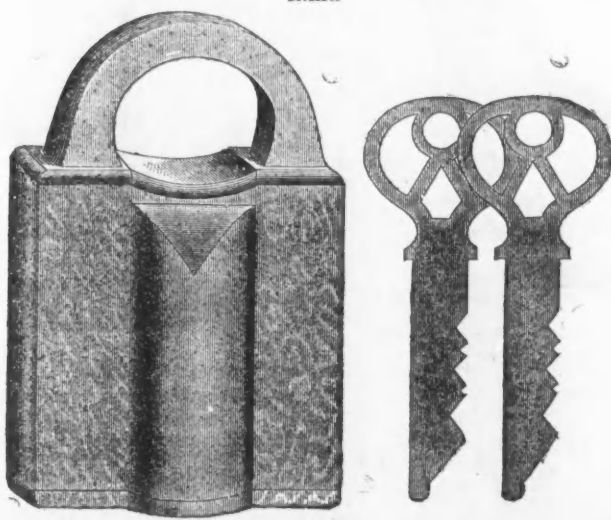
Our BELTING is made of Leather, tanned on the surfaces only; the interior (which is the Fiber and strength of the belt) is not tanned, but is white and soft, and is our patented process. Our Belting is more pliable, and has the pulley better, and transmits more power than any other belt. Our Rawhide Lace Leather and Belt Grease, are the best in use.

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We make out of our Patent Leather, Valves for furnaces which we claim last five times as long as any other. We will furnish for trial \$2.00 worth, without charge, to each of the first ten parties sending for sizes. We also send a useful little book on Belting free, on application. Agents in all important cities.

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For all Kinds of Agricultural Implements, Stoves, &c.

ALL MALLEABLES MADE FROM IMPROVED AIR FURNACES.

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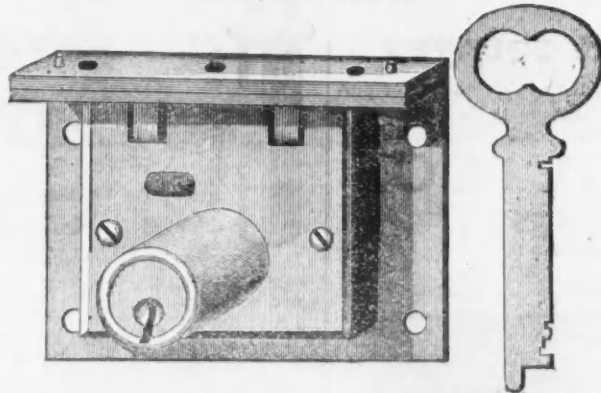
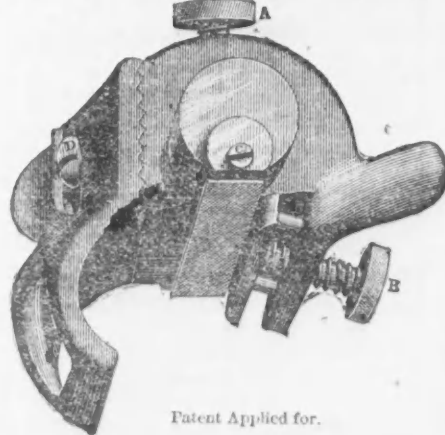
**THE ONLY PIN-TUMBLER PAD LOCK**  
EVER PRODUCED.

It is self-locking and perfectly secure. It is made of brass and finished by our patented process. We now make three sizes: No. 4005, 1 3/4 in.; No. 4006, 1 1/2 in.; and 4007, 1 1/4 in. The "changes" that can be made in these locks are so numerous that no two locks will ever be made alike, unless they are so ordered.

For Sale by Hardware Jobbers Throughout the Country.

**THE WHIPPLE MFG. COMPANY,**  
CLEVELAND, OHIO,**FINE BRONZE DOOR LOCKS, KNOBS**  
AND TRIMMINGS.

REAL BRONZE BUTTS, STORE DOOR HANDLES with ORNAMENTAL BRONZE FRONT LOCK AND LATCH, And a general line of BUILDERS' HARDWARE.

**THE CHARLES PARKER CO.,**  
MERIDEN, CONN.,**MANUFACTURERS OF CABINET LOCKS.****The "Challenge" Lawn Mower Sharpener.**

Patent Applied for.

A NEW and much needed article, and adjustable to any Lawn Mower made.

**SIMPLE AND RELIABLE!**  
**CHEAP AND DURABLE!**

Per doz. \$12.00. Discount to the Trade.

EVERY DEALER SHOULD HAVE THEM IN STOCK.

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**ALL MAKES OF BARBED FENCE WIRE,**  
Stretchers, Diggers, Staples, &c. And  
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The Great Railroad Paint.

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Pure White Lead, Red Lead, Litharge, Orange Mineral, Linseed Oil, AND PAINTERS' COLORS.

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**The Atlantic White Lead and Linseed Oil Co.,**  
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Raw, Refined and Boiled.

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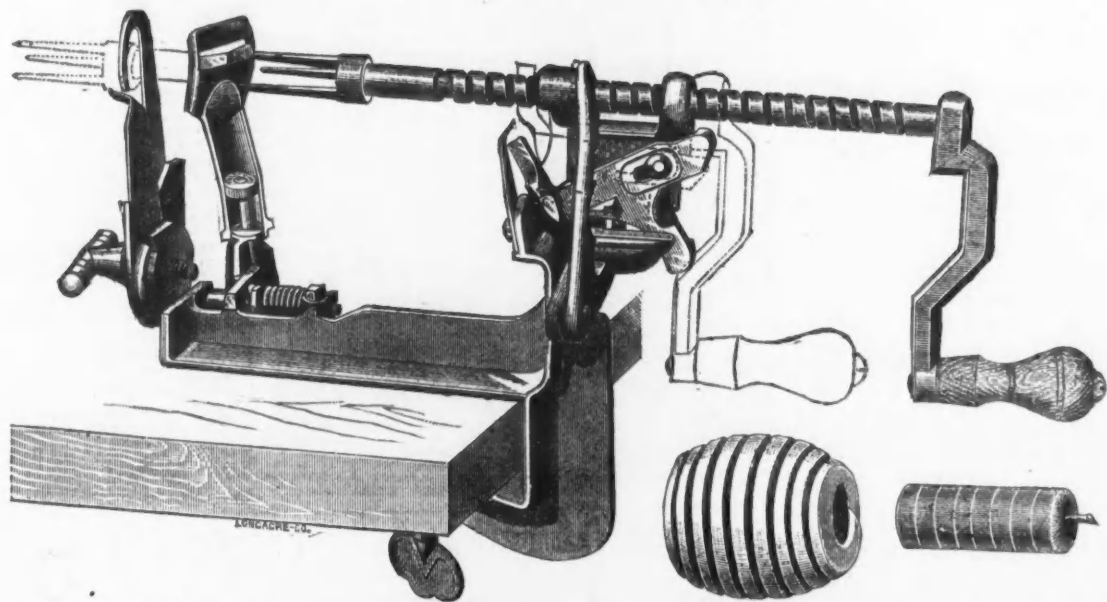
R. Onderdonk.



# ADVANCE APPLE PARER, CORER, AND SLICER OF 1882.

Patented October 19, 1875, and Patents Pending.

**The Only Machine ever Invented that will Entirely Pare, Core, and Slice an Apple.**



With one hand you can Pare, Core and Slice an Apple and withdraw the Fork from the Core.

MANUFACTURED BY THE

**READING HARDWARE CO., READING, PA.**

U. S. COAST AND GEODETIC SURVEY OFFICE,  
WASHINGTON, June 10th, 1882.

MESSRS. RIEHLÉ BROTHERS, Philadelphia:

Dear Sirs.—In reply to your letter of the 8th inst. asking me for an expression of my opinion in regard to the merits of the Weighing and Testing Machines constructed by you, I must mainly refer you to my findings as one of the Judges at the Centennial Commission, on which occasion I made a careful comparative examination of the manufactures of different firms. You will find in the published volume of Reports and Awards, Group XXV, Page 8, the following special commendation:

"A comparatively modern form among Weighing Machines is the Railway Platform Scale, of which the conditions are that it shall always be ready for action, and admit of loads as great as forty tons being rolled upon it without injury to its suspension. The construction of these Machines is most developed in the United States, and the plan of Riehlé Brothers, of Philadelphia, has appeared to the Judges to offer the greatest guarantee of accuracy and durability."

Also on Page 153 you will find the following award:

"RIEHLÉ BROTHERS, Philadelphia, Pa., U. S. WEIGHING AND TESTING MACHINES."

Commended for the manufacture of Railway Track Scales, and Testing Machines for ascertaining the strength of materials; of superior design and construction, combining true mechanical principles with great judgment and ingenuity in the disposition of parts."

Since the foregoing opinions were written, I have had occasion to know that you have made many improvements in details of construction, and that you maintain your position in the foremost rank of constructors of Weighing and Testing Machines.

Yours respectfully,

J. E. HILGARD,

(Copy.) Superintendent.

**GUN POWDER.**  
**Laflin & Rand Powder Co.,**

No. 99 Murray Street, New York.  
Manufacture and sell the following celebrated brands of Sporting Powder known everywhere as

**ORANGE LIGHTNING,**  
**ORANGE DUCKING,**  
**ORANGE RIFLE**

more popular than any Powder now in use.  
**Blasting Powder and Electrical Blasting Apparatus.**

Military Powder on hand and made to order.  
**SAFETY FUSE, FRICTIONAL & PLATINUM FUSES.**

Pamphlets showing sizes of grain sent free.

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**THE**  
**QUEEN CITY MALLEABLE IRON CO.,**

Make all Shapes and Sizes of

**Malleable Iron Castings**

known to the trade. Our specialty is

**WELDING MALLEABLE CASTINGS.**

Guaranteed to weld perfectly and capable of being drawn under a hammer. Address,

**N. W. Cor. Vine and Second Sts.,**

**Works, 585 & 587 Eastern Ave.,**

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## The "Eureka" Pipe Cutter



**THE BODY**—is fitted with an adjustable Cast-Steel Jaw at the point where it comes in contact with the Pipe, which Jaw can be renewed at any time by simply removing one screw. By this system the wearing away of the Jaw (which in other cutters is the first part to give out) is effectually prevented, and this tool can be kept in first-class order at all times.

**THE WHEEL BLOCK**—This is also of Steel, neatly fitted to its socket and cannot be dropped out. It is much more durable than the cast-iron blocks and is hardened at the point where the rod comes in contact with it.

**THE HANDLE**—of this Cutter is put on to stay, and cannot be removed by the roughest usage, as it is an iron handle, cast fast to the Rod, operating the block.

—MANUFACTURED BY—

**Pancoast & Maule**

243 & 245  
SOUTH THIRD  
STREET  
PHILADA.



52 Canal St., Chicago.

## GREATEST ROCK BREAKER ON EARTH.

**CAPACITY** { A TON A MINUTE.  
DON'T FORGET I.  
Guaranteed to do Double the Work of  
any other or Money Refunded.

SEND FOR CIRCULARS.

ALSO,  
Engines, Boilers, Stamp Mills and  
Mining Machinery.

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IRON WORKS.**

## Wyoming Shovel Works,

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Patent Plain Back Solid Shovels and Spades, Back Strap Shovels,  
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**RAILROAD AND MINERS' SHOVELS of Superior Quality a Specialty.**

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## CLARK'S IMPROVED SCREW DRIVER,

And Case containing Handle and Set of

**SCREW DRIVERS.**

The Blades are made of JESSOP'S CAST STEEL, with milled Points and Shanks, making them interchangeable, and are warranted. This Driver has four Blades from 1/4 inch to 1 inch in width.

MANUFACTURED BY  
**R. H. BROWN & CO.,**

SUCCESSORS TO  
**WM. A. & F. E. CLARK.**

**Westville, Conn.**

## NOTICE.

Gentlemen:

We refer you to our advertisement in the issue of June 8th. There will only be two more like it, one July 6th and one August 3d, for the Sheet Iron business will not stand any such expense long, as you know; therefore, look at them carefully, pick out the kind of Hods and Shovels you want and forward your orders before they are all gone. We have a large stock now and can fill all orders promptly, but if the strike lasts it will be impossible to get iron at any price; therefore send on your orders early, for those that come first will be first served.

**IRON CLAD MFG. CO.,**

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IN USE BY

**Meat & Fish  
Packers,  
ICE CREAM  
MAKERS,  
HOTELS,  
CONFECTIONERS.**

Five Sizes, from \$5  
to \$100.

Send for Circular to  
**J. S. L. WHARTON**  
15th & Wood Sts.,  
Philadelphia, Pa.

WILMINGTON, DEL., April 17th, 1882.

GENTLEMEN:—In regard to yours of March 23th, would say that in addition to the one bought of you in 1881 to run by hand, we bought one in 1881 to run by steam, and run through it 17 tons in less than two hours (No. A). We are now using both in different places, and like them very much. They are a much better machine for the purpose than any I have yet seen. Yours, truly,

JACOB PUSEY, Pres't., Kennebec Ice and Coal Co.

**SAVES ICE, TIME, MONEY.**

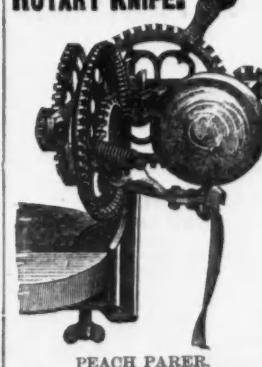
## SCOTT MANUFACTURING CO.,

BALTIMORE, MD.,

SOLE PATENTEES AND MANUFACTURERS.

ROTARY KNIFE.

GOLD MEDAL.



**ONLY PEACH  
PARER.**



**THE  
BEST APPLE  
PARER.**

**PEACH PARER.**  
The drawing cut of the revolving knife is the only known principle for a machine to pare peaches successfully. The Machine has little in common with ordinary parers.

**APPLE PARER.**  
Enlarged and improved. Is the only successful Parer with a quick return movement of the knife. All the wheels have square holes and shafts with square ends, so they can not work loose.



**UNIVERSAL CAN OPENER.**  
SOLID CAST-STEEL SHANK AND KNIFE.

Adjustable to cans of any shape and size. Also,

Patent Pea Sorting Machines For Packers Use  
Patent Peach Pitting Machines For Packers Use  
Also Manufacturers of Medallion and Victoria Egg Beaters.

## BARREL AND STAVE MACHINERY.

The best in the world.  
For circulars, address  
**H. A. CROSSLEY,**  
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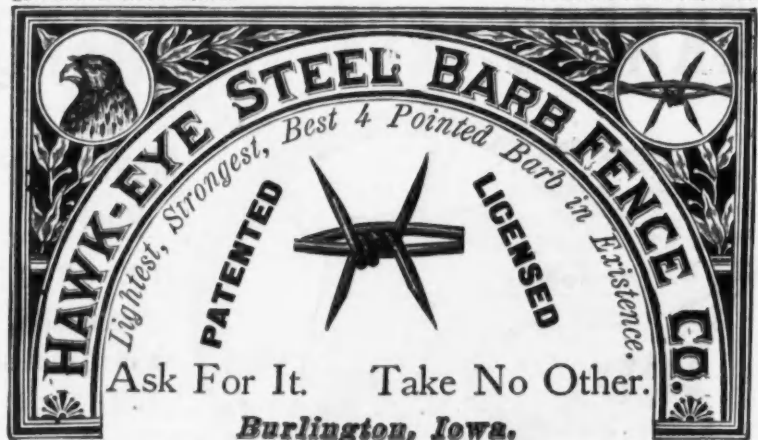
Issues Policies of Insurance after a careful inspection of the Boilers  
COVERING ALL LOSS OR DAMAGE TO  
**Boilers, Buildings and Machinery,**  
ARISING FROM  
**STEAM BOILER EXPLOSIONS.**  
The Business of the Company includes all kinds of Steam Boilers.  
Full information concerning the plan of the Company's operations can be obtained at the  
**COMPANY'S OFFICE, HARTFORD, CONN.,**  
or at any agency.

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**KELLY STEEL BARB WIRE!**  
**IS THE BEST.**  
We do not sell to jobbers, and want but **ONE RELIABLE DEALER** in each town. Correspondence solicited. Prices, samples, etc., sent on application.  
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BEST AND CHEAPEST.  
Established 1845.  
Office, foot of Houston Street, East River,  
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CLAY RETORTS, TILES, &c.,  
Twenty-third Street,  
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Twenty years' practical experience.

**WATSON FIRE BRICK CO.,**  
ESTABLISHED 1845.  
Successors to JOHN R. WATSON, Perth Amboy, New Jersey  
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FOR ROLLING MILLS, BLAST FURNACES, FOUN-  
DRY GAS WORKS, LIME KILNS, TANNERIES,  
BOILER AND GRATE SETTING, GLASS WORKS, &c.  
Fire Clays, Fire Sand, and Kaolin for Sale.

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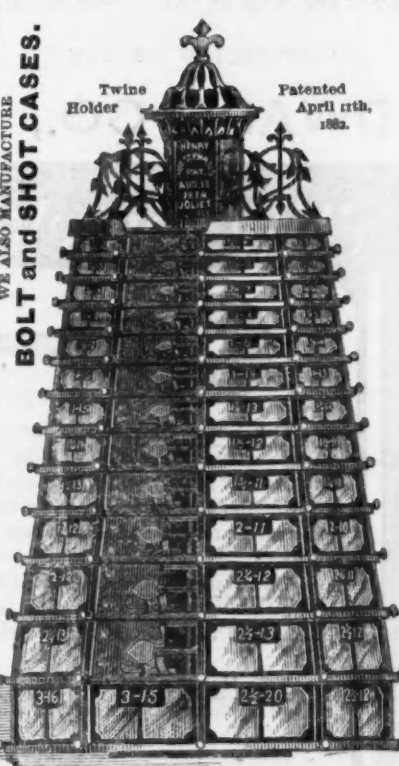
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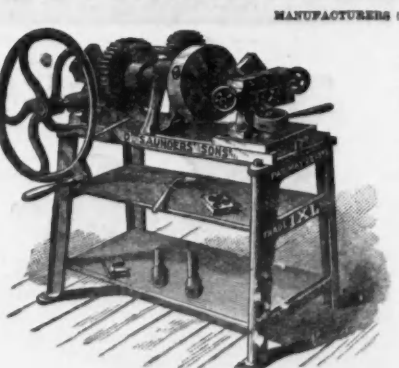
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same time enabling the customer to see what he  
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Anything made of wood we all know is not  
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within. Any one shelf of our case would carry  
50 pounds in one compartment, and revolve as  
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we guarantee our case for 5 years, and if not  
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Western Office 89 Wood Street Pittsburgh, Pa.



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<b>Chains.</b>	
Bradley & Co., 25 Richmond St., Phila. Pa.	5
Cincinnati Rolling Mills and Chain Works, Cincinnati, O.	44
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<b>Chain Belting.</b>	







**Fruit, Wine & Jelly Press.**

**SAUSAGE STUFFER.**

**MOLASSES.**  
Self-Measuring Faucet.

Twenty different sizes from \$2 to \$100  
Awarded First Premium Everywhere.

**NO. 20 COFFEE MILL.**

**MRS. POTTS' Cold Handle Double Pointed Sad Irons.**

Tincture Presses,  
Self-Weighing  
Cheese Knife,  
Cork Presses.

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**THE BEST ARE THE CHEAPEST.**

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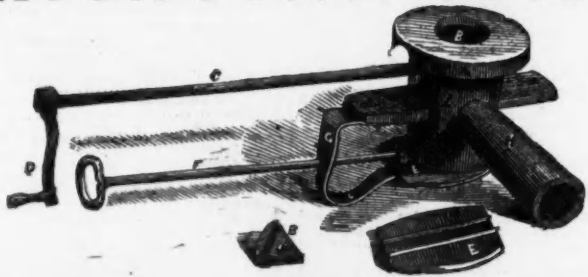
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Adjustable Jaw.  
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ADAPTED TO ALL KINDS OF VISE WORK. ALSO  
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FITS ANY VISE. SOLD BY THE TRADE.  
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## DOOR BOLTS,

Plain, Japanned, Bronzed and Plated.

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**PATENT COMBINATION WRENCH.**

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, case-hardened throughout, and not only combine all of the superior qualities of our Cylinder or Gas Pipe Wrenches, but also all requisite combinations of a regular Nut Wrench thus making a combination which has no equal.

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The **BEST** Hanger and Rail in the market. Will not break; cannot get off the track.  
As cheap as the best cast iron.

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Snow and Ice cannot lodge on the Rail.  
Write for Circulars.  
HENRY B. NEWHALL is Agent for our Hangers in New York City.

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**CHAMPION HOG RINGER RINGS and HOLDER.**  
Only double ring ever invented. The only Ring that will effectively keep Hogs from rooting. No sharp points in the nose.

**EAGLE BILL CORN HUSKER**  
Is the best Husker in the market. Farmers say it is the best. Use no other.

**BROWN'S HOG AND PIG RINGER and RINGS.**  
Only single Ring in the market that closes on the outside of the nose. No sharp points in the nose to keep it sore.

Ringers 75c. Rings, 10c. 100. Holders, 75c. Huskers, 15c.  
**CHAMBERS, BEKING & QUINLAN, Exclusive Manufacturers, Decatur, Ill.**

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## WROUGHT IRON STAPLES.

All kinds of Merchant Staples kept in Stock, and Special Staples for any purpose made to order by  
**WHEELING HINGE CO., Wheeling, W. Va.**

**Patent Steel Tube and Flue Brush.**  
Best in the market.  
Made any size required.  
Combines the properties of a Scraper and Brush.  
Full stock always on hand.  
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Manufacturers of **SAND & EMERY PAPER & EMERY CLOTH.**  
(Also in Rolls, for machine work.)  
Ground Emery, Corundum & Flint, Glue & Curled Hair, Hair Felt, & Felt-  
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Stores: PHILADELPHIA, 730 Market St.; BOSTON, 143 Milk St.;  
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## Mineral Wool.

A fibrous material, encasing about 90 per cent. of its volume of air, and therefore a superior  
**NON-CONDUCTOR OF HEAT AND SOUND.**  
Being made from the slag of blast furnaces, it is fire-proof and durable in contact with heated surfaces. Readily applied.  
Ordinary Grade, 24 lbs. per cubic foot.  
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Circular and Sample free by mail.

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**WITHEROW & GORDON,**  
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Agents for the  
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OVER 600 IN USE.

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**MORGAN'S VARIABLE BLAST TUYERE IRON**

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**THE MORGAN VARIABLE BLAST-TUYERE IRON**

With the front plate removed, showing the Rotating Air Tubes by which four different sized currents of air may be passed, making any size fire from 3 to 18 inches in diameter. We also furnish an attachment by which we make a narrow fire long or short. This Tuyere Saves Half the Coal, makes a clean fire, gives a center blast, and directs just the amount of heat needed to the point to be heated.  
We also furnish a Water Tuyere (see advertisement in first issue of this month) that keeps fire-bed cool, prevents Tuyere from burning, and gives all the hot water needed.  
All Tuyeres guaranteed to please or no sale.  
Special inducement to the trade. Catalogues sent free. Address  
**A. W. MORGAN & CO.,**  
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**A. F. PIKE,**  
Pike Station, - New Hampshire,  
Manufacturer and Wholesale Dealer in  
**Bluestone**  
For Scythes, Axes, Knives and Turpentine Hacks.  
Factories at Pike Station, N. H., and Evansville & Westmore, Vt.  
Genuine Old Reliable,  
Indian Pond (Red End),  
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German Pattern,  
Chocolate, &c. &c.  
Stones made, labeled and branded in any style desired. Fracture and QUALITY GUARANTEED. All the above brands are of good, even grit and will not glaze.

## PERFECTION WINDOW CLEANERS

LOOKEE! WASHEE WASHEE VEELEE QUICKEE!!!  
PERFECTION

Perfection Window Cleaners can be procured in any quantity from the leading Hardware, Woodenware and Rubber Houses of this country and Europe. Among whom are the following:

- EASTERN RUBBER CO., Boston, Mass.
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- GOODYEAR RUBBER CO., (and Branches) Chicago, Ill.
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Dealers will be careful to ask for the Perfection Window Cleaner, and take no other, as all others are infringements which we shall promptly suppress. See that all have two rubbers and bear our name and date of patents.

## PERFECTION WINDOW CLEANER CO.,

232 La Salle St., CHICAGO, ILL.

**Grindstones, Emery, &c.**

## Walter R. Wood, GRINDSTONES.

Berea, O., Nova Scotia, & other brands.  
983 and 985 Front Street, New York.

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The largest manufacturers in the world of  
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Of all description.  
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Of All Kinds.  
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Quarrymen and Stone Merchants.  
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of genuine Nova Scotia and other grits from our own quarries. Mounted stones and fittings, scythes and oil stones, polishing grits, &c.  
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Importers and Dealers in all kinds of  
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Stones for Machinists, Carpenters, Farmers and Glass Cutters constantly on hand and cut to order.



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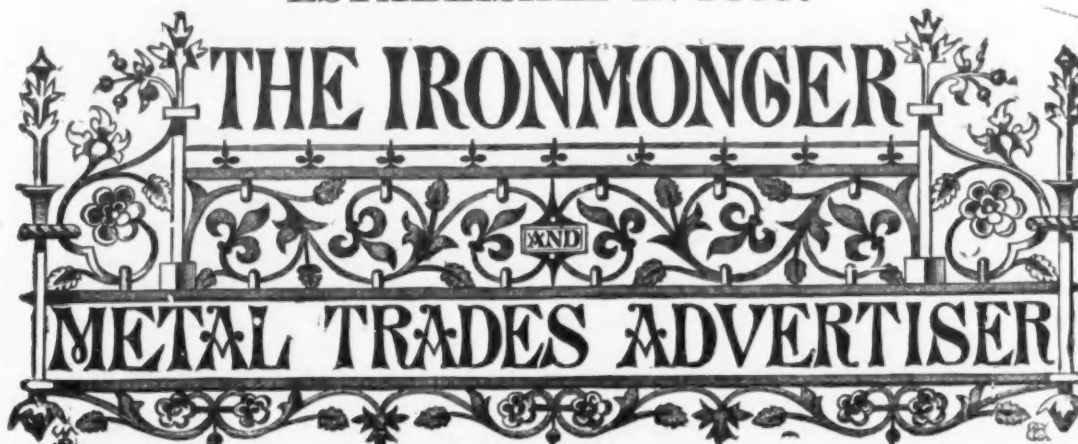
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to the Iron, Hardware and Metal Trades. In addition to the above, there is a carefully classified list of Patents, together with Editorial Notes, French  
Belgian and other Special Correspondence.

## SUBSCRIPTIONS

to the Ironmonger and Metal Trades Advertiser, with which is sent every fourth week the Foreign Supplement (see below), may commence from any  
date, but are not received for less than a year complete. The rate is \$5 per annum, inclusive of postage to any part of the world outside Great Britain.  
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In the spring and autumn of each year there is published a Special Issue, the circulation of which is not less than Twelve Thousand (12,000) copies.

## THE IRONMONGERS' DIARY AND TEXT BOOK.

This is an annual presented free to every Subscriber to the IRONMONGER AND METAL TRADES ADVERTISER.  
It contains a large number of ruled skeleton pages for diary and other entries, and in addition much useful reference information, varied from year to  
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## THE FOREIGN SUPPLEMENT,

With which is incorporated The Universal Engineer,

is published every fourth week in connection with the extensive and world-wide circulation of the Ironmonger itself. The dates of its publication for the  
next twelve months will be as follows:JULY 8, AUGUST 5, SEPTEMBER 2 and 30, OCTOBER 28, NOVEMBER 25, DECEMBER 23, 1882, JANUARY 20, FEBRUARY 17, MARCH 12  
APRIL 7, MAY 5, JUNE 2 and 30, 1883.

This Supplement is published in

## FOUR LEADING COMMERCIAL LANGUAGES

of the world, including English, and is sent to all the countries where they are spoken, thus placing the contents of the Ironmonger not only within reach  
but in the native language of eighty millions of German, forty-two millions of French, twenty-eight millions of Italian, and fifty-one millions of Spanish  
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Advertisers will do well to use Illustrations freely. Where economy of space is an object, a left page illustrated and described in one language can  
be suitably described in four or more languages on the opposite or right page without illustrating.

## THE WHOLE FOREIGN HARDWARE TRADE

so far as our experience of twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. Thus a Price List or Advertiser's  
sent inserted in the Ironmonger and Foreign Supplement is a strikingly powerful and most efficient way of publicity not to be compared with any other  
ordinary channels of communication.



# HENRY DISSTON & SONS,

KEYSTONE SAW, TOOL, STEEL & FILE WORKS,  
Front and Laurel Streets, PHILADELPHIA.

## DISSTON'S SAMSON TREE PLANTER AND POST HOLE DIGGER.

Fig. 1.

Patented May 29, 1879.

Fig. 2.

Price, - - - \$37.50 per dozen.

No Farmer, Nurseryman, Railroad  
or Telegraph Company  
SHOULD BE WITHOUT ONE.

NO BACK-ACHE.

NO KNEE-WORK.

NO CLOGGING.

This tool has been thoroughly tested, and has given the greatest satisfaction to all who have tried it. The principle on which it works makes it self-cleaning and prevents adhesion in sticky soil; therefore it always works free and easy. It is far superior to all plungers, augers and boring machines, as it works well in stony, sandy, or clay soils; quicksand under water is as easily removed as though no water existed.

## DIRECTIONS.

Plunge the Digger into the ground, as shown in cut, Fig. 1, and when the soil is loosened pull out the lever with one hand, as shown in cut, Fig. 2, which will press the dirt between the blades; then draw the Digger from the hole, keeping hold of the lever with one hand and the handle with the other. When the Digger is clear of the hole, you can deposit the load anywhere within reach by simply pressing down the lever, which will open the blades and the dirt will fall from between them. The Digger is then ready for another plunge. The steel blades are nine inches long, and the whole tool five feet long. For sale at Hardware and Agricultural Stores.

HENRY DISSTON &amp; SONS.

# BROWER & LEEDS,

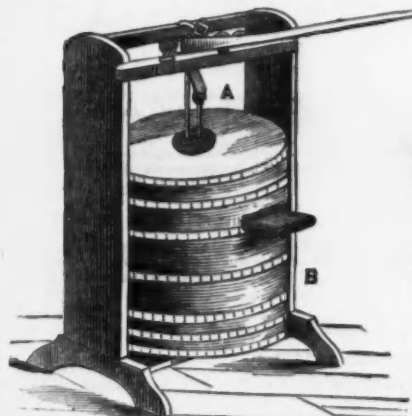
81 Murray Street, NEW YORK,

SOLE AGENTS IN THE UNITED STATES FOR

## BAYLISS' HURRICANE BELLOW,

Portable Forges and Hot Blast  
and Water Tuyeres.

SUPERIOR TO ANY. Send for Circulars.



Cuyahoga Falls, Ohio.

Tinned  
Belt Rivets  
AND  
Burrs a Specialty.

EASTERN AGENTS,  
Alford, Ward, Davenport & Co.  
85 Chambers St., New York.

## MORSE TWIST DRILL AND MACHINE CO.

NEW BEDFORD, MASS., Sole Manufacturers of

Morse Patent Straight-Lip Increase Twist Drill,  
Beach's Patent Self-Centering Chuck, Solid and Shell Reamers,  
BIT STOCK DRILLS,

DRILLS FOR COES, WORCESTER, HUNTER AND OTHER HAND DRILL  
PRESSES. BEACH'S PATENT SELF-CENTERING CHUCKS, CENTER  
AND ADJUSTABLE DRILL CHUCKS, SOLID AND SHELL REAMERS.  
DRILL GRINDING MACHINES. TAPER REAMERS, MILLING  
CUTTERS AND SPECIAL TOOLS TO ORDER.

All Tools exact to Whitworth Standard Gauges.

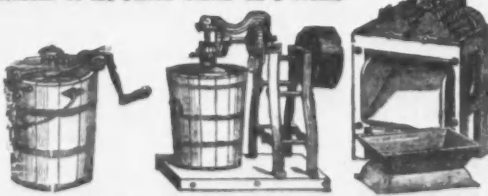
GEO. R. STETSON, Supt.

EDWARD S. TABER, Treas.



## SANDS' TRIPLE MOTION WHITE MOUNTAIN ICE CREAM FREEZERS.

THE WHITE MOUNTAIN FREEZER COMPANY are headquarters for Ice Cream Freezers and Ice  
crushers, being the only firm in the United States who manufacture all parts of the raw material. The  
Examining Committee, consisting of 50,000  
Wisdom of the United States have recom-



HAND FREEZER.

HAND OR POWER.

HAND OR POWER.

White Mountain Freezer Co.,

Nashua, N. H., U.S.A.

SPECIAL ATTENTION GIVEN TO EXPORT ORDERS.

## The Most Durable and Best Selling Bucket for Chain Pumps.

It has no valves to become obstructed and no screw  
joints to become immovable by rust.  
Advantages of the Crosby Bucket over all others:—1.  
It has an air chamber on top, which conducts the air to  
the bottom of the well. 2. It is self-expansive, the  
base of the bucket being of an inch larger at the  
bottom than here in the tubes, which allows it to  
expand, and the  
groove in the side to  
contract. 3. The  
wear comes on the  
whole side, and not  
on the extreme edge  
like other buckets.  
4. It contains more  
solid rubber than  
three of any other  
manufacture.



Three sizes—14  
inch for deep wells,  
12 inch for 40 feet  
or less, 2 inch for  
stock pumps.  
No charge for Ter-  
ritorial Rights.  
NONE GENUINE  
unless A. D. Crosby  
appears in raised  
letters on base of  
each bucket.

Send for Price List. Agents wanted in every  
county. Address A. D. Crosby, Patentee and General  
Agent, Cuba, Allegany county, N. Y. For Sale by W.  
& B. Douglas, 25 and 27 John St., N. Y., and all General  
Hardware and Pump Dealers.



SEEGER  
Jack  
SCREWS.

Cast with perfect seamless thread  
by new patent process.  
Much cheaper than wrought iron  
and warranted to stand more pres-  
sure.  
Liberal discount to the trade.

SEEGER MFG. CO.,  
Box 1513, SPRINGFIELD MASS.  
BUTLER & GOLDEY MFG. CO.,  
Limited.,

AGENTS 97 Chambers St., New York.  
GEORGE W. BRUCE,  
1 PLATT ST., NEW YORK.

Proprietor of the ATLANTIC SCREW WORKS,  
Agent for the Florence Tack Co.,  
AND SOLE AGENT FOR  
C. A. Maynard's Trowels.

A full stock of all Patterns, London, N. Y.,  
Philadelphia, Boston, Lowell and Portland on hand.  
Every Trowel warranted.



## Prouty's Patent PEERLESS FORCE PUMP.

Has Self-Adjustable Foot Rest.

NEW AUTOMATIC COMPENSATING  
PACKING.

It will throw a continuous jet FROM  
FORTY TO SIXTY FEET. A new pattern  
jet and spray nozzle is sent with  
each pump.

Especially attention is called to the  
material and workmanship exhibited  
in these pumps.

LIST PRICE, \$8.

THE NEW ENGLAND BUTT CO.  
PROVIDENCE, R. I.



## J. STEVENS & CO.,

Chicopee Falls, Mass., P. O. Box 224,

Manufacturers of

## SPRING CALIPERS AND DIVIDERS

Also, Surface Gauges and Counter Sinks, Stevens' Patent  
Breech-Loading Sporting Rifles, double and single barrel; Shot  
Guns, Pocket Rifles, Pocket Pistols, and the noted Hunters' Pet  
Rifles. Our

## SHOOTING GALLERY RIFLE

Is the favorite everywhere.

## PHILADELPHIA SMELTING COMPANY, Limited.

S. E. Cor. Twelfth and Noble Sts., PHILADELPHIA.

### GENUINE BABBITT.

Guaranteed at a speed of 10,000 a minute, and at any  
pressure for 10 years.  
Office JAMES BUTTERWORTH & SON, Manufacturers of Woolen Machinery, 262, 264 and 266 E. Adams St.  
PHILADELPHIA, October 17, 1891.

PHILADELPHIA SMELTING COMPANY.—GENTLEMEN: We have been running your "Genuine Babbitt"  
on our wood drilling machine for the last eight years at a speed of 2000 revolutions per minute, with-  
out renewal. We have found it to be the best metal we ever used.  
Yours truly, JAMES BUTTERWORTH & SON.

### DEOXIDIZED BRONZE,

Superior to Phosphor Bronze or any other alloy of Copper and Tin for Machinery Journals.

PHILADELPHIA SMELTING COMPANY, City.—GENTLEMEN: After a trial of eighteen months of your  
"Deoxidized Bronze" as journal boxes in our rolling mill, where great pressure is required, we  
take pleasure in recommending it as being superior to any we have heretofore used.  
Very truly, HENRY DISSTON & SONS.

## ELBA IRON & BOLT CO., Limited.

MANUFACTURERS OF

## MERCHANT BAR IRON,

Skelp Iron, Splice Bars, Railway Track Bolts, Car, Bridge,  
and Machinery Bolts, Nuts, &c.

We invite the attention of RAILROAD MEN especially to our make of SPLICE BARS and Track  
Bolts. Using the best brands of REFINED IRON, and paying close attention to the finish of our  
manufactures, we are enabled to offer our patrons BOLTS, NUTS, SPLICE BARS, &c., of excellent  
quality. Our works have been enlarged within a few years; all orders are now executed with prompt-  
ness; all our work guaranteed.

SEND FOR PRICE LISTS AND INFORMATION TO

ELBA IRON &amp; BOLT CO. Limited, Pittsburgh, Pa.

## BEECHER & PECK,

Successors to Milo Peck, Manufacturers of



PECK'S DROP LIFTER is the only one which has its parts  
cushioned. Being thus cushioned they are the most durable Lifter in  
the market.

Can be attached to any drop now in use.

Send for Illustrated Catalogue.

Cor. Lloyd and River Sts.,

New Haven, Conn.

## PURE TURKISH EMERY,

EXCELSIOR POLISH FUMIF  
METAL QUARTZ AND ROTTEN STONE  
WALPOLE EMERY MILLS.  
MILLS, SO. WALPOLE 114 MILK ST. BOSTON, MASS.

## THE "MOUNT CARMEL" OX SHOE.

Steel Toe Calk.

FINISHED READY FOR NAILING ON.

WARRANTED

The Best and Cheapest Shoe Made.

IVES, WOODRUFF &amp; CO.

Manufacturers,

MOUNT CARMEL, CONN.

For sale by dealers in blacksmiths' supplies.

## NOVELTY IRON FOUNDRY.

HAIGHT &amp; CLARK, 16 &amp; 18 De Witt St., Albany, N. Y.

Manufacturers of

FINE GRAY IRON CASTINGS OF EVERY DESCRIPTION.

Rosettes and Pickets for Wire Workers, Castings for Furniture and Piano

Manufacturers. Iron and Metal Patterns of all kinds a Specialty.

Correspondence solicited for JAPANNING, COPPERING, BRONZING.



PHILADELPHIA.

Corrected Weekly by Lloyd, Silliman & Walton.  
Terms, 30 days. For 60 or 90 days, interest added at 10% per cent. per annum.

**Anvils.**  
Pete Wright's, 100 lbs. \$100.00  
Over 200 lbs. 110.00  
Trenton 100.00  
**Apple Parers.**  
Globe Apple Parer, \$6.00 net  
Penn Apple Parer, \$6.00 net  
Lots of 10 to 25 dozen special prices  
**Bay State Peach Parer** \$9.00

**Axes.**  
Hunt's Kentucky and Yankee, per doz \$10.00 net 10.50  
Robert Mann, \$10.00 net 10.50  
Richland Chief, \$10.00 net 10.50  
Beveled Axes, \$10.00 net 10.50  
Double Bit Axes, \$10.00 net 10.50

**Augers and Auger Bits.**—New List January 7, 1895.  
Bates' Nut Augers, \$10.00 net 10.50  
Cook's Augers, \$10.00 net 10.50  
Watrous' Ship Augers, \$10.00 net 10.50  
Benjamin Pierce Auger Bits, \$10.00 net 10.50  
Gravel Auger Bits, \$10.00 net 10.50  
Cook's, \$10.00 net 10.50  
Jennings, \$10.00 net 10.50  
Bonney's Pat. Hol. Augers, list \$10.00 net 10.50  
Steamers' Pat. Hol. Augers, list \$10.00 net 10.50  
**Balances.**  
Light and Common, \$10.00 net 10.50

**Bells.**  
Sevin Bros. Mfg. Co. Light Hand Bells, \$10.00 net 10.50  
Swiss Pattern Hand Bells, \$10.00 net 10.50  
Connell's Door Bells, \$10.00 net 10.50  
Gt. Western & Kentucky Cow, new list, \$10.00 net 10.50

**Boring Machines.**  
Upright, without Augers, \$10.00 net 10.50  
Angular, without Augers, \$10.00 net 10.50  
**Bolts.**—Eastern Carriage Bolts, \$10.00 net 10.50  
Philadelphia, \$10.00 net 10.50  
Stanley, Wrought Shutter, \$10.00 net 10.50

**Braces.**—Barber's, \$10.00 net 10.50  
Backus, \$10.00 net 10.50  
Spoonford, \$10.00 net 10.50  
American Mill, \$10.00 net 10.50

**Butts.**—Cast Fast Joint, Narrow, \$10.00 net 10.50  
Cast Loose Joint, Narrow, \$10.00 net 10.50  
Broad, \$10.00 net 10.50  
Acorn, Loose Pin, \$10.00 net 10.50  
Mayer's Loose Joint, \$10.00 net 10.50  
Wrought Loose Pin, \$10.00 net 10.50  
Table Hinges and Back Flaps, \$10.00 net 10.50  
Narrow, Fast, \$10.00 net 10.50  
Loose Joint, \$10.00 net 10.50

**Blind Butts.**  
Fackler, \$10.00 net 10.50  
Shepard, \$10.00 net 10.50  
Lull & Porter, \$10.00 net 10.50  
Huffer, \$10.00 net 10.50

**Chains.**—German Hailer and Coll. List December 31, 1894.  
Best Proof Chain, \$10.00 net 10.50  
Best Proof Chain, \$10.00 net 10.50  
Best Proof Chain, \$10.00 net 10.50

**Chisels.**—Socket Framing, \$10.00 net 10.50  
Socket Framing, \$10.00 net 10.50  
Butcher's, \$10.00 net 10.50

**Casters.**—Bed (new list July 1, 1895), \$10.00 net 10.50  
Plate, \$10.00 net 10.50

**Coffee Mills.**—Box and Side, new list Jan. 1, 1895.  
Enterprise, \$10.00 net 10.50

**Cutlery.**—Walden Pocket, \$10.00 net 10.50  
Penna. Knife Co., \$10.00 net 10.50  
Lander's, \$10.00 net 10.50  
Goodnow Mfg. Co. and Meriden Cutlery Co., Manufacturers' prices net.

**Drawing Knives.**  
Hart Mfg. Co., \$10.00 net 10.50  
Adjustable Handle, \$10.00 net 10.50

**Fry Pans.**  
Tinned, \$10.00 net 10.50  
Burnished, \$10.00 net 10.50

**Files.**  
Nicholson, \$10.00 net 10.50  
Denton, \$10.00 net 10.50  
Butcher, \$10.00 net 10.50

**Fluting Machines.**  
Eagle, \$10.00 net 10.50  
Crown, \$10.00 net 10.50  
Geneva, \$10.00 net 10.50

**Hammers.**  
Yorker & Plumb's, new list, \$10.00 net 10.50  
Howell A. E. Nail Hammers, \$10.00 net 10.50

**Handles.**  
Denton Loop Handles Crosscut, \$10.00 net 10.50  
Boynton Loop Handles Crosscut, \$10.00 net 10.50

**Hinges.**  
Yorker & Plumb, new list, \$10.00 net 10.50  
Hunt, \$10.00 net 10.50

**Hoops.**  
Strat and T., \$10.00 net 10.50  
Morris, \$10.00 net 10.50

**Knives.**  
Lantern, \$10.00 net 10.50  
Buckeye, \$10.00 net 10.50

**Lawn Mowers.**—Pennsylvania, \$10.00 net 10.50  
Philadelphia, \$10.00 net 10.50

**Lawn and Garden Pumps.**—List \$10.00 net 10.50  
Metcalf, \$10.00 net 10.50

**Machines.**  
Long and Short Cutter, \$10.00 net 10.50  
Pennsylvania Pattern, \$10.00 net 10.50

**Measuring.**  
Enterprise Mfg. Co.'s Measuring Faucets, \$10.00 net 10.50  
Lander's, \$10.00 net 10.50

**Meat Cutters.**  
Dixon's, \$10.00 net 10.50  
Woodruff, \$10.00 net 10.50

**Plumbing.**  
Stanley's Adjustable, \$10.00 net 10.50  
Picks, \$10.00 net 10.50

**Razor Straps.**  
Lamont Combination, \$10.00 net 10.50  
Imitation Emerson, \$10.00 net 10.50

**Shovels.**  
Stanley's, \$10.00 net 10.50  
Clippers, \$10.00 net 10.50

**Saws.**  
Denton's Circular, \$10.00 net 10.50  
Cross-Cut No. 2, Plain Tooth, \$10.00 net 10.50

**Shovels and Iron.**  
Stanley's, \$10.00 net 10.50  
Clippers, \$10.00 net 10.50

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Stanley's, \$10.00 net 10.50  
Clippers, \$10.00 net 10.50

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Stanley's, \$10.00 net 10.50  
Clippers, \$10.00 net 10.50

**Shovels and Iron.**  
Stanley's, \$10.00 net 10.50  
Clippers, \$10.00 net 10.50

**Screws.**  
Flat Head Iron, \$10.00 net 10.50  
Round Head Iron, \$10.00 net 10.50

**Stamps.**  
Plated, \$10.00 net 10.50  
German Silver, \$10.00 net 10.50

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Plated, \$10.00 net 10.50  
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German Silver, \$10.00 net 10.50

**Stamps.**  
Plated, \$10.00 net 10.50  
German Silver, \$10.00 net 10.50

**Nails.**  
See Pittsburgh Trade Report.  
**Best Quality Refined Cast Steel.**  
Square, Flat, Octagon and Round.  
1/2 to 2 inches, inclusive, \$10.00 net 10.50  
2 to 3 inches, \$10.00 net 10.50  
3 to 4 inches, \$10.00 net 10.50  
4 to 5 inches, \$10.00 net 10.50  
5 to 6 inches, \$10.00 net 10.50  
6 to 7 inches, \$10.00 net 10.50  
7 to 8 inches, \$10.00 net 10.50  
8 to 9 inches, \$10.00 net 10.50  
9 to 10 inches, \$10.00 net 10.50  
10 to 12 inches, \$10.00 net 10.50  
12 to 14 inches, \$10.00 net 10.50  
14 to 16 inches, \$10.00 net 10.50  
16 to 18 inches, \$10.00 net 10.50  
18 to 20 inches, \$10.00 net 10.50  
20 to 22 inches, \$10.00 net 10.50  
22 to 24 inches, \$10.00 net 10.50  
24 to 26 inches, \$10.00 net 10.50  
26 to 28 inches, \$10.00 net 10.50  
28 to 30 inches, \$10.00 net 10.50  
30 to 32 inches, \$10.00 net 10.50  
32 to 34 inches, \$10.00 net 10.50  
34 to 36 inches, \$10.00 net 10.50  
36 to 38 inches, \$10.00 net 10.50  
38 to 40 inches, \$10.00 net 10.50  
40 to 42 inches, \$10.00 net 10.50  
42 to 44 inches, \$10.00 net 10.50  
44 to 46 inches, \$10.00 net 10.50  
46 to 48 inches, \$10.00 net 10.50  
48 to 50 inches, \$10.00 net 10.50  
50 to 52 inches, \$10.00 net 10.50  
52 to 54 inches, \$10.00 net 10.50  
54 to 56 inches, \$10.00 net 10.50  
56 to 58 inches, \$10.00 net 10.50  
58 to 60 inches, \$10.00 net 10.50  
60 to 62 inches, \$10.00 net 10.50  
62 to 64 inches, \$10.00 net 10.50  
64 to 66 inches, \$10.00 net 10.50  
66 to 68 inches, \$10.00 net 10.50  
68 to 70 inches, \$10.00 net 10.50  
70 to 72 inches, \$10.00 net 10.50  
72 to 74 inches, \$10.00 net 10.50  
74 to 76 inches, \$10.00 net 10.50  
76 to 78 inches, \$10.00 net 10.50  
78 to 80 inches, \$10.00 net 10.50  
80 to 82 inches, \$10.00 net 10.50  
82 to 84 inches, \$10.00 net 10.50  
84 to 86 inches, \$10.00 net 10.50  
86 to 88 inches, \$10.00 net 10.50  
88 to 90 inches, \$10.00 net 10.50  
90 to 92 inches, \$10.00 net 10.50  
92 to 94 inches, \$10.00 net 10.50  
94 to 96 inches, \$10.00 net 10.50  
96 to 98 inches, \$10.00 net 10.50  
98 to 100 inches, \$10.00 net 10.50

**Crucible Cast Steel.**  
Open Hearth Cast Steel.  
Sheet Steel—Crucible.  
To 21 gauge, \$10.00 net 10.50  
22 gauge, \$10.00 net 10.50  
23 gauge, \$10.00 net 10.50  
24 gauge, \$10.00 net 10.50  
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67 gauge, \$10.00 net 10.50  
68 gauge, \$10.00 net 10.50  
69 gauge, \$10.00 net 10.50  
70 gauge, \$10.00 net 10.50  
71 gauge, \$10.00 net 10.50  
72 gauge, \$10.00 net 10.50  
73 gauge, \$10.00 net 10.50  
74 gauge, \$10.00 net 10.50  
75 gauge, \$10.00 net 10.50  
76 gauge, \$10.00 net 10.50  
77 gauge, \$10.00 net 10.50  
78 gauge, \$10.00 net 10.50  
79 gauge, \$10.00 net 10.50  
80 gauge, \$10.00 net 10.50  
81 gauge, \$10.00 net 10.50  
82 gauge, \$10.00 net 10.50  
83 gauge, \$10.00 net 10.50  
84 gauge, \$10.00 net 10.50  
85 gauge, \$10.00 net 10.50  
86 gauge, \$10.00 net 10.50  
87 gauge, \$10.00 net 10.50  
88 gauge, \$10.00 net 10.50  
89 gauge, \$10.00 net 10.50  
90 gauge, \$10.00 net 10.50  
91 gauge, \$10.00 net 10.50  
92 gauge, \$10.00 net 10.50  
93 gauge, \$10.00 net 10.50  
94 gauge, \$10.00 net 10.50  
95 gauge, \$10.00 net 10.50  
96 gauge, \$10.00 net 10.50  
97 gauge, \$10.00 net 10.50  
98 gauge, \$10.00 net 10.50  
99 gauge, \$10.00 net 10.50  
100 gauge, \$10.00 net 10.50

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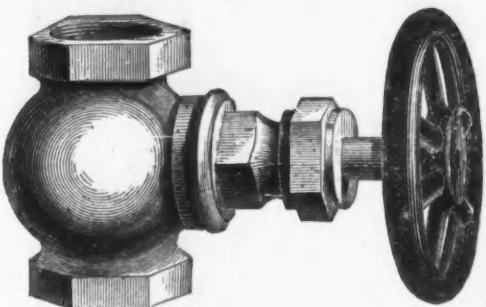
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65 gauge, \$10.00 net 10.50  
66 gauge, \$10.00 net 10.50  
67 gauge, \$10.00 net 10.50  
68 gauge, \$10.00 net 10.50  
69 gauge, \$10.00 net 1







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They are nicely packed in boxes, one dozen each of 50 pounds weight, suitable for shipping by land or water to any part of the world.  
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The Best and Cheapest in Use.  
DIRECTIONS.—Tack the carpet at one side of the room, then go to the other side, and with the stretcher draw the carpet into place, leaving the spur a few inches from the base-board. Take up the slack in the carpet under the spur and drive the spur gently into the floor; it will hold the carpet in place while you drive the tacks. Manufactured by  
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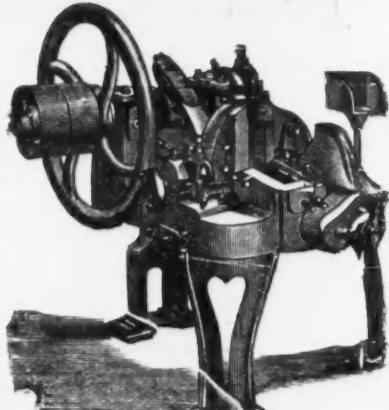
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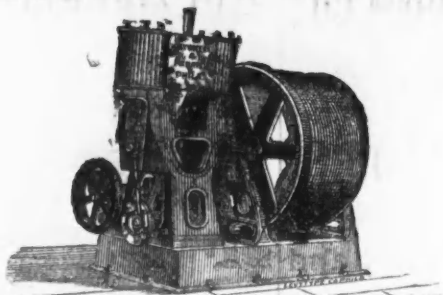


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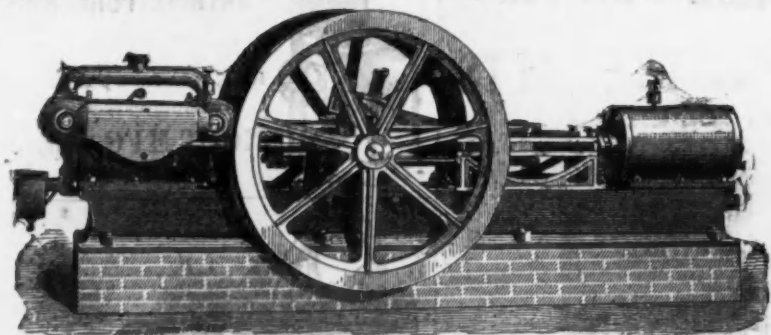
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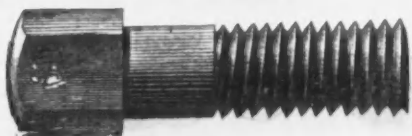
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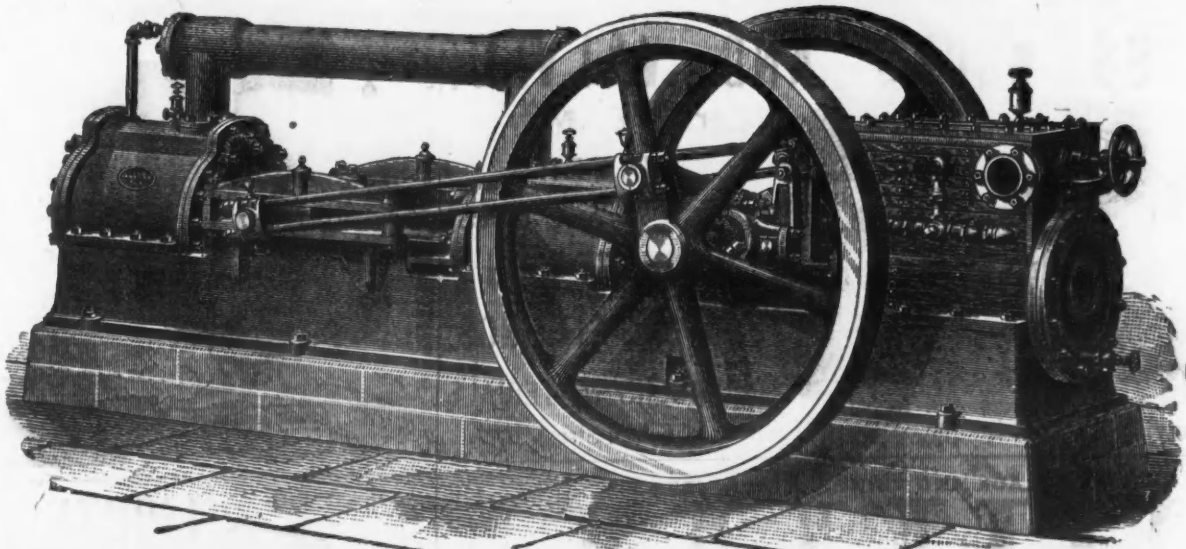
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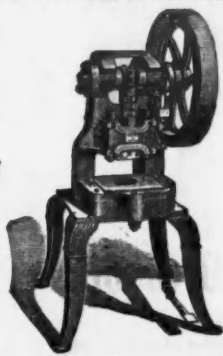
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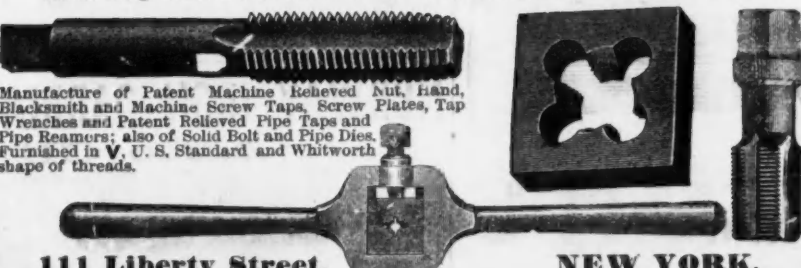
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Compact, Practical, Durable and  
Economical.

Acknowledged to be the best in use. This boiler  
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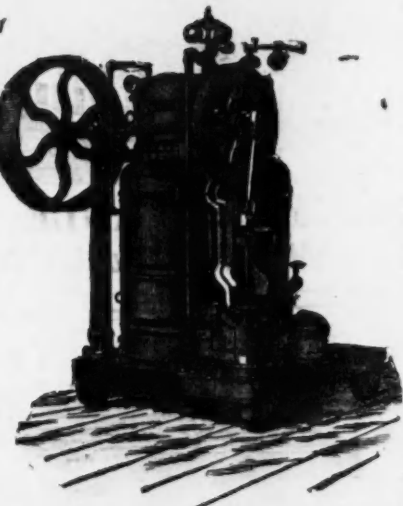
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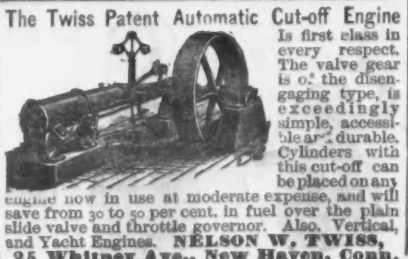
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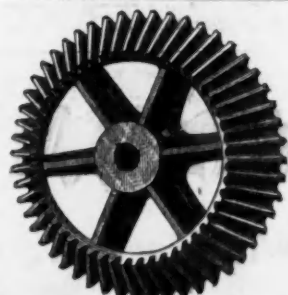
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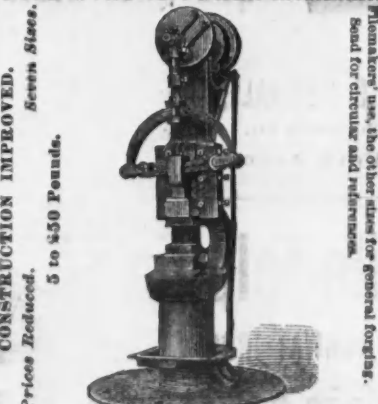
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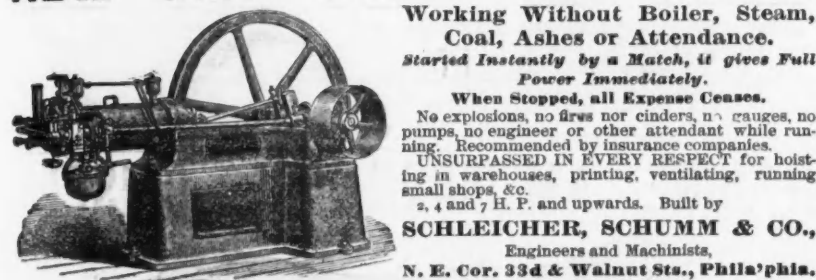
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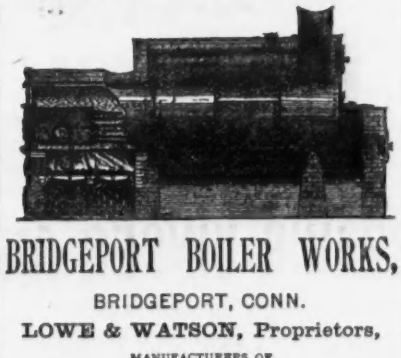
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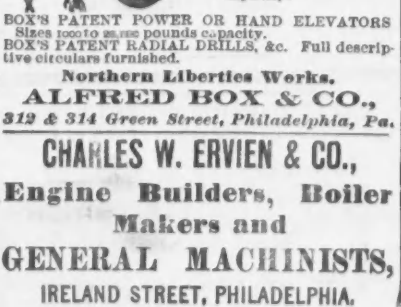
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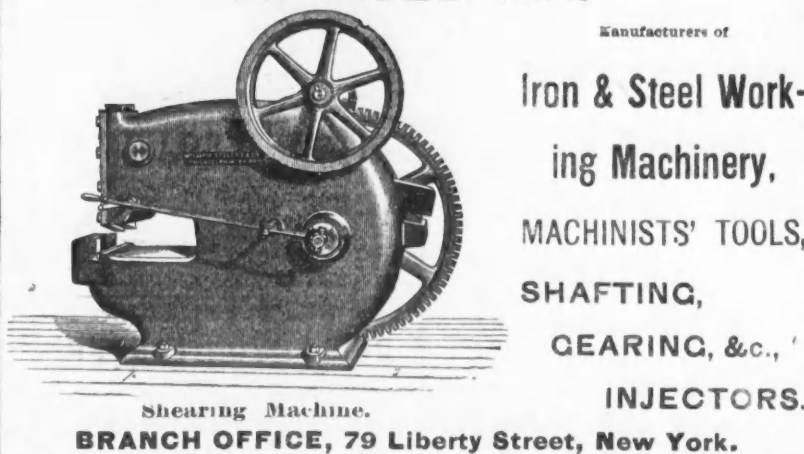
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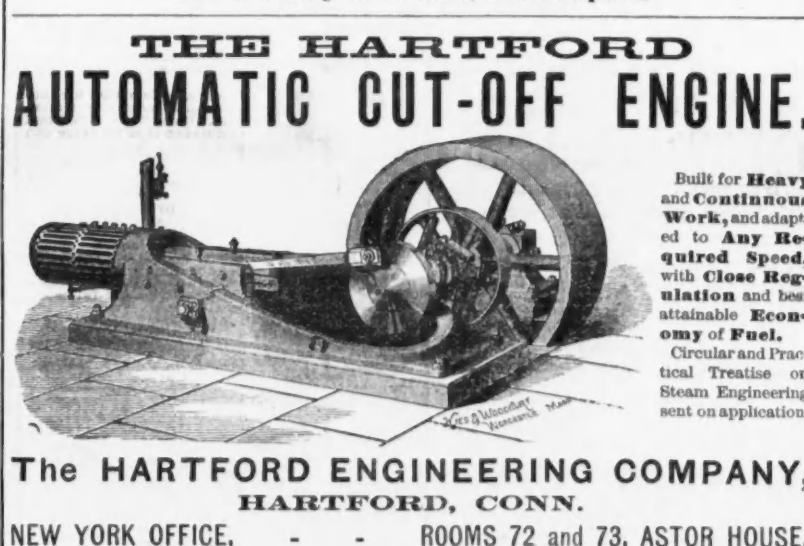
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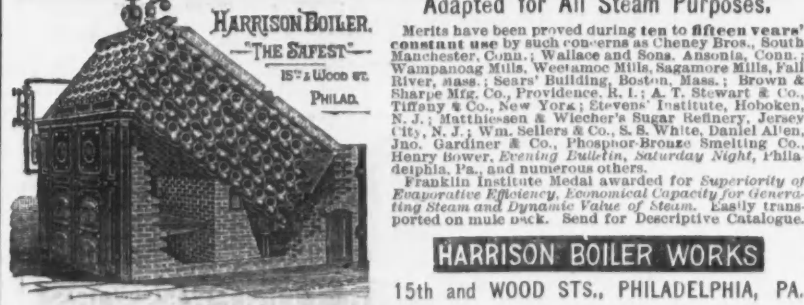


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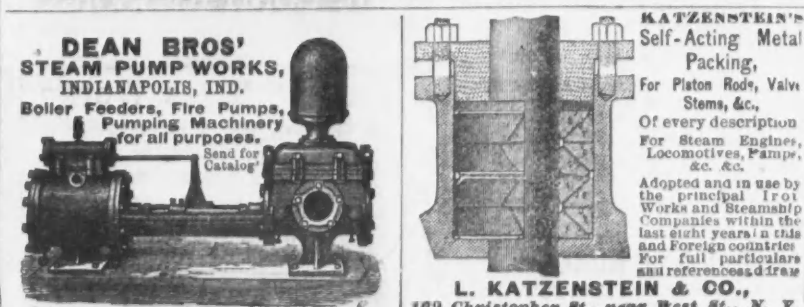


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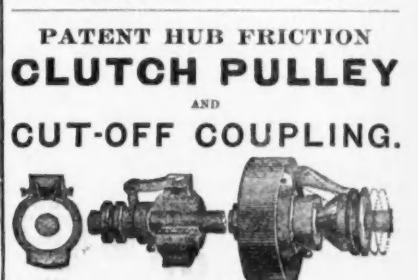
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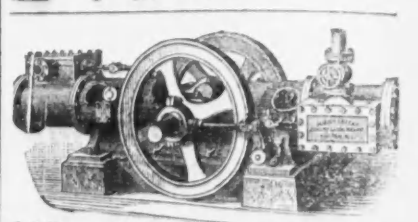
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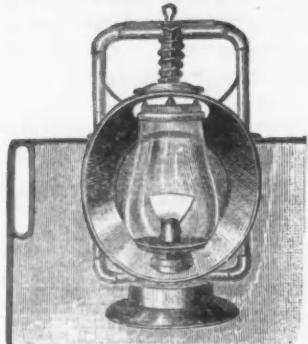
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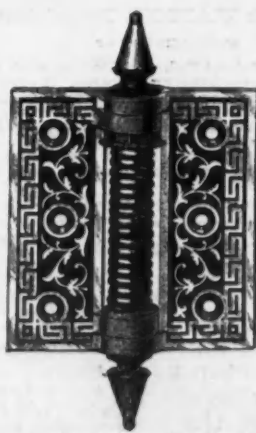
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